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No 2 September 1990
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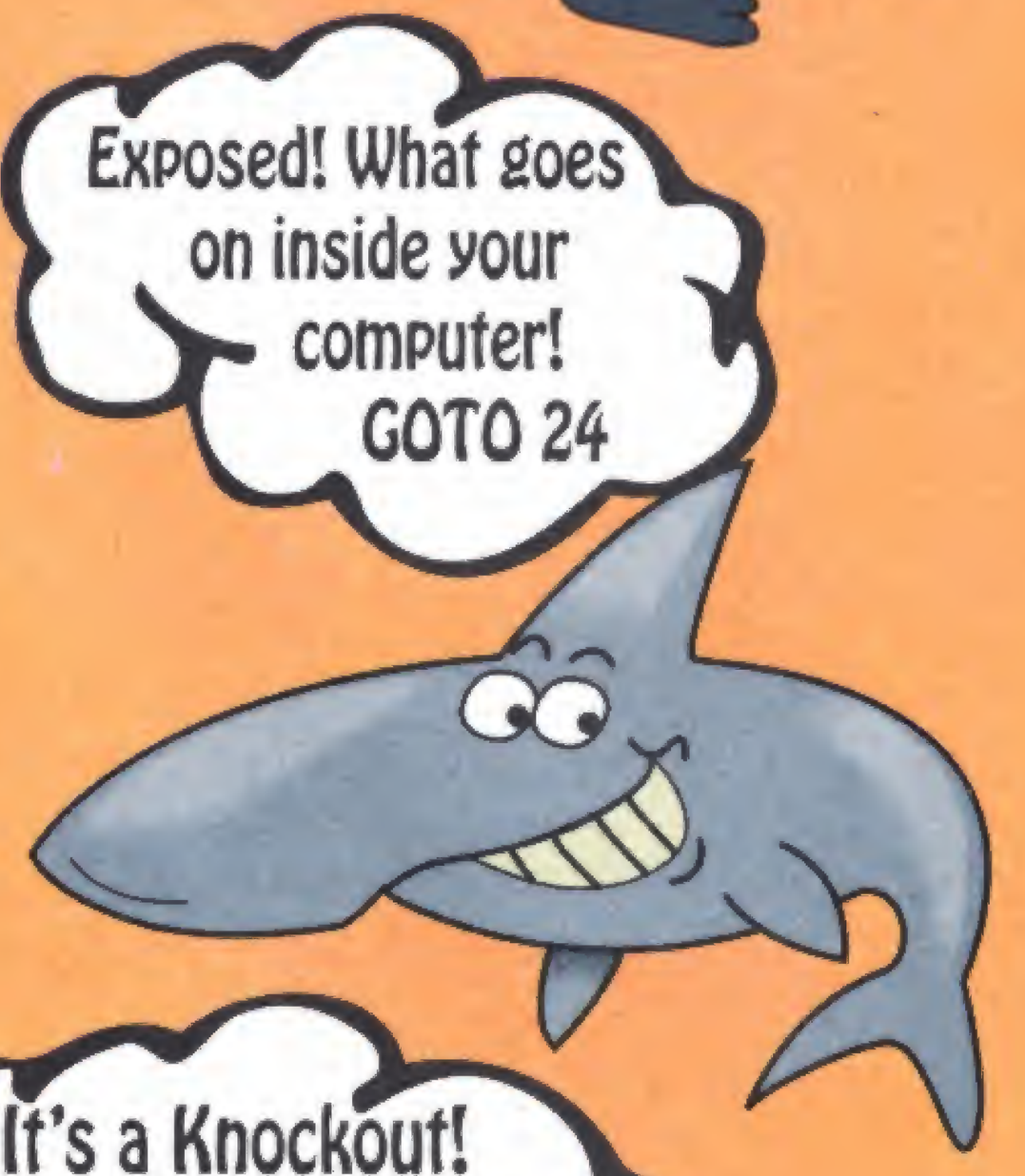
Well, you asked for it! This month we're including programs suitable for a much wider range of computers than in our first issue. That's because so many of you wrote to us asking us to do this.

***Let's Compute!* is here to give you what YOU want. If there's anything YOU would like to see in future issues please write and tell us.**

Our address is below. And we're all waiting to hear from you!



Managing Editor Derek Meakin
Features Editor Peter Davidson
Art Editor Mark Nolan
Ace Cartoonist Mike Goldberg
Production Editor Peter Glover
Ad Manager John Snowden
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Noticeboard

Your Safe Scientist program is very useful. We were talking about molecules in Science recently, so already know a bit about them. But seeing the smoke particle being pushed around the screen would sort of help people believe that the molecules ARE moving all the time.

It might actually be interesting to have the molecules visible on the screen, but in a totally different colour to the smoke particle so it's easy to tell them apart.

However I suppose the program would be a bit too long then.

– Annette Knight (age 11), Lincoln

The program is intended to simulate the real experiment and you can't see the real molecules in that.

If you have any tips for other readers, send them in. If you have any questions about your micro or software just ask us. We'll try to answer them on the Noticeboard.

Let us know what you want to see in future issues. And if we use your letter or ideas we'll send you a *Let's Compute!* baseball hat!

Send your letters to *Let's Compute!* Europa House, Adlington Park, Macclesfield SK10 4NP. Remember to tell us your age.

I got the first issue of *Let's Compute!* today. It's brilliant! I read all about it in Electron User and went charging around everywhere looking for it.

I would like to see a hints and cheats column with passwords to games. I think your magazine is totally brilliant.

– Benjamin Garton (age 11), Loughborough, Leicestershire.

Thanks for the compliments. We're looking into the possibility of a cheats column. But in the meantime does anyone have any we could pin to the noticeboard?

Let's Compute! is absolutely brilliant, fab, mega, cool and trendy! Turtle Tune Time was a good idea – it's always fun to make music on a computer. However the REM lines in the program listing are TOTALLY unnecessary.

Everyone I know who knows anything about REM lines just skips them. But for the people who don't, it's a waste of time typing them in.

I know – I used to do the same thing until someone told me that REM lines were useless!

You do the same thing with the typing program. Cutting the REM lines would make it three lines shorter.

Why do all the programs have to have REMs at the beginning? Is there a real reason for it? Please tell me!

– Lesley Underwood (age 11), Manchester

You're quite right. However, all good programmers put REMs at the start of their programs to let everyone know what they're about. But did you know that REMs can be made to do something? Try typing in and RUNning this silly example on a BBC Micro:

```
10?(PAGE+19)=&F1
20REM"Who said REM did nothing?"
30?(PAGE+19)=&F4
```

These handsome certificates are now on their way to all those readers who entered our Alphabet Artist contest. There's more about it on Page 9.

Valiant Roamer Contest Results

From the hundreds of correct entries to the competition in our preview issue the following five are the lucky winners:

D. Galpin (age 15), Combe Down, Avon.
C. Cowley (age 7), Allesley Park, Coventry.
T. Batchelor (age 10) Leeds.
J. Brunning (age 9) Abington, Cambridge.
G. Plant (age 32), Billingham, Cleveland.

board

I've been trying out the programs that come on the BBC Micro disc with the *Let's Compute!* Club Pack, and I think they're great.

I like Sea Wolf. I found it a sort of upside-down Space Invaders! Bird Basher is really brill. After I'd tested it out I played it for ages just for fun. I got a great high-score of 301,500!!!

I enjoyed playing Key Man as well. But I have one small query – why are the 'pineapples' RED? I've heard of red cabbage and blood oranges, but PINEAPPLES? No way!

Roobix Clock is quite fun too, but I'm useless at Rubik's Clock, Rubik's Cube and Rubik's Magic.

The Wordsquare Unscrambler is a good idea. It's also something that everyone can use. But it's just a LITTLE bit cheating, isn't it? Like my crossword dictionary.

Bones is really brilliant! My sister and I watched it three times in a row, we liked it so much. Who on earth did that program? Please tell whoever it is that I think they must be incredibly clever to do something like that on the computer!

– John Wright (age 12), Northumberland.

The 'incredibly clever' person who created Bones is none other than *Let's Compute!* ace cartoonist Mike Goldberg. He's obviously a man of many talents!

I bought *Let's Compute!* not realising it was not for my Sinclair Spectrum.

I found it very interesting, but was disappointed because I couldn't type in the programs as they were for the BBC Micro, Electron and Archimedes.

So could you please do some of your future programs in Spectrum lingo?

– D. J. Perry, Avon.

We've been swamped by requests to make Let's Compute! programs work on different micros.

So from now on, where possible, we'll include conversions for the Spectrum, Commodore 64/128, Amstrad CPC, Atari ST using STOS and Amiga using AMOS.

Many of the BBC Basic programs will work on the PC if you use an emulator.

STOS and AMOS are available from Database Software, Europa House, Adlington Park, Macclesfield SK10 4NP.

PC owners can obtain copies of B Basic from Border Computing, Greenbank, Dog Kennel Lane, Bucknell, Shropshire SY7 OAX for £85.

I Love the Computer Critters. They look really sweet. In case I don't win one in the competition, can you tell me how I can buy one?

– Henry Woodley (age 13), Brighton.

We're had lots of letters like this. Yes, you can buy a Computer Critter – see Page 23.

I have found an answer to your typewriter puzzle. Here is the listing:

```
10 INPUT""A$
20 VDU2
30 PRINT A$
40 VDU3
50 RUN
```

This is written for the BBC Micro.

– Matthew Jack (age 8), Farnham, Hants.

Well done Matthew! In the preview issue of *Let's Compute!* we gave this challenge: How do you use the Delete key while using your micro as a typewriter?

Matthew's was the first correct answer we received.

I thank you very much for getting a computer comic on the market. It is just what I've been waiting for.

It will teach better Basic without the boredom. I think it is a fab idea that you are going to cover Logo because it helps you with your maths. I have already done a reasonable amount at school.

I am really looking forward to the next issue of *Let's Compute!*

The main point that I am going to make is about the challenge you set in the preview issue. It was to try and get the Delete button to work on the Typewriter program. It already works! So what was the point of the challenge?

Another thing I'd like to see is more games reviews on recent releases. It might even cheer up Rom.

– Nigel Collins (age 12), Richmond, North Yorks.

The Delete button worked with the text on the screen – but not with what was printed out. The challenge was to make it work in both places.

KÖMPUTER

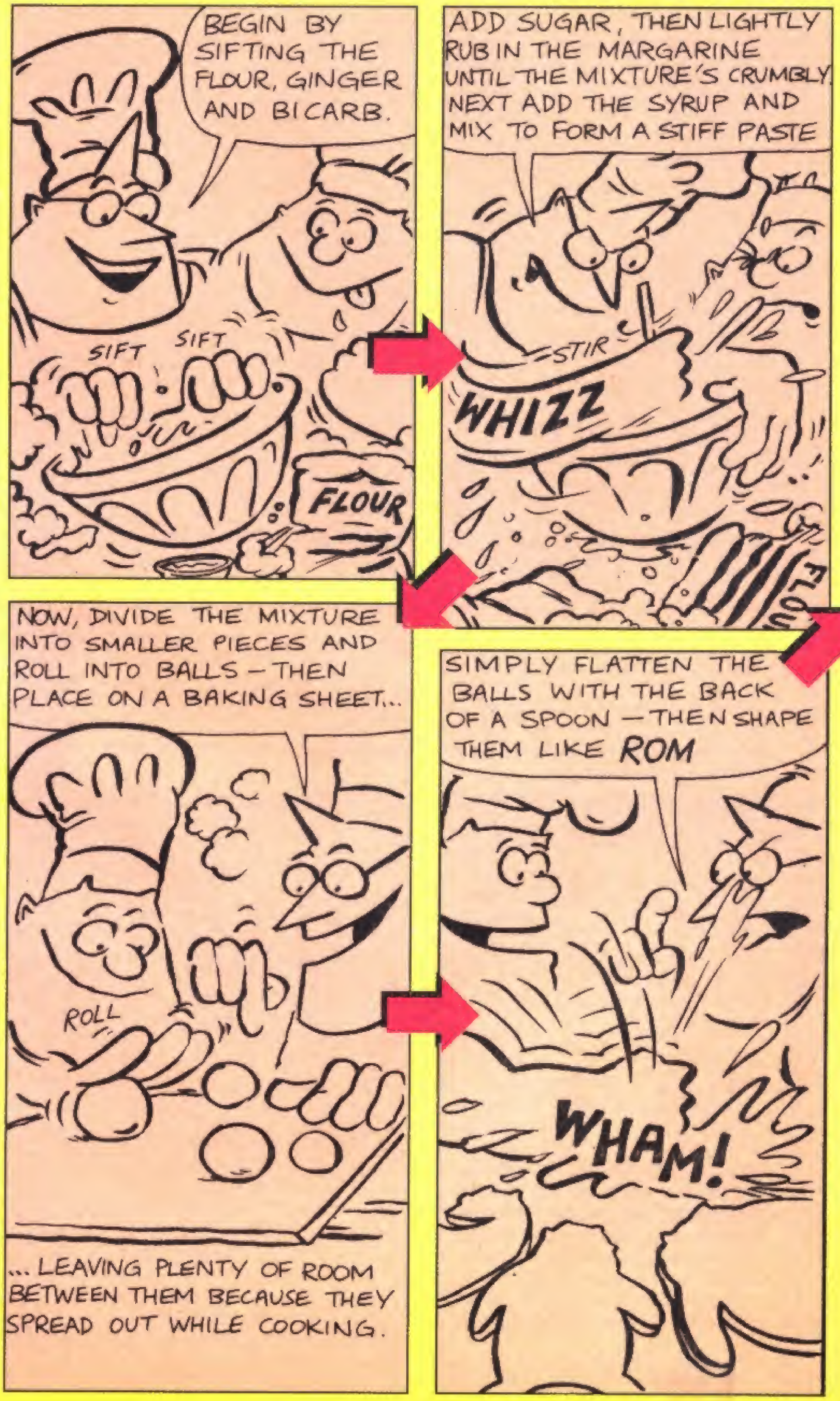
This program will show you the exact quantity of ingredients you need to make any number of Gingerbread Roms. Type it into your computer and RUN it. You will be asked how many Roms you would like to make. Key in the number – and away you go!

```
   10 LET t$="Gingerbread Roms"
   20 REM (c) Let's Compute!
   30 READ q,i
   40 DIM h(i),u$(i),o$(i)
   50 FOR l=1 TO i:READ h(l),a$,b$:LET u
$(l)=a$:LET o$(l)=b$:NEXT
   60 PRINT:PRINT t$:PRINT:PRINT "How ma
ny ";t$;" do you want to make";
   70 INPUT " "m
   80 PRINT:PRINT "You will need:-"
   90 PRINT:LET t=m/q:FOR l=1 TO i
  100 GOSUB 130:PRINT CHR$(32);:IF (h(l)
*t)<1 THEN PRINT "of a ";
  110 PRINT u$(l);:IF (h(l)*t)>1 THEN PR
INT "s";
  120 PRINT " of ";o$(l):NEXT:END
  130 IF u$(l)="teaspoon" THEN GOSUB 170
:RETURN
  140 IF u$(l)="tablespoon" THEN GOSUB 1
70:RETURN
  150 IF u$(l)="gram" THEN LET z=10:GOSU
B 280:RETURN
  160 PRINT h(l)*t;:RETURN
  170 LET r=INT (h(l)*t):LET f=(h(l)*t)-
r
  180 IF f>.875 THEN PRINT;r+1;:RETURN
  190 IF r<>0 THEN PRINT ;r;
  200 IF f<.125 AND r<1 THEN PRINT ;r;:R
ETURN
  210 IF f<.125 THEN RETURN
  220 IF f<.375 AND r<1 THEN PRINT ;"Qua
rter";:RETURN
  230 IF f<.375 THEN PRINT ;" and a quar
ter";:RETURN
  240 IF f<.625 AND r<1 THEN PRINT ;"Hal
f";:RETURN
  250 IF f<.625 THEN PRINT ;" and a half
";:RETURN
  260 r<1 THEN PRINT ;"Three quarters";:
RETURN
  270 PRINT ;" and three quarters";:RETU
RN
  280 LET v=INT (((h(l)*t)+5)/10):PRINT
;v*z;:RETURN
  290 DATA 12,6
  300 DATA 162,"gram","self raising flou
r",1,"teaspoon","ground ginger"
  310 DATA 1,"teaspoon","bicarbonate of
soda",40,"gram","granulated sugar",50,"g
ram","margarine",2,"tablespoon","golden
syrup"
```

Electron/BBC/Archimedes and CPC owners
The program will work as shown.

Commodore 64/128 owners
Enter the program in capitals.

Spectrum owners
Use GO SUB instead of GOSUB

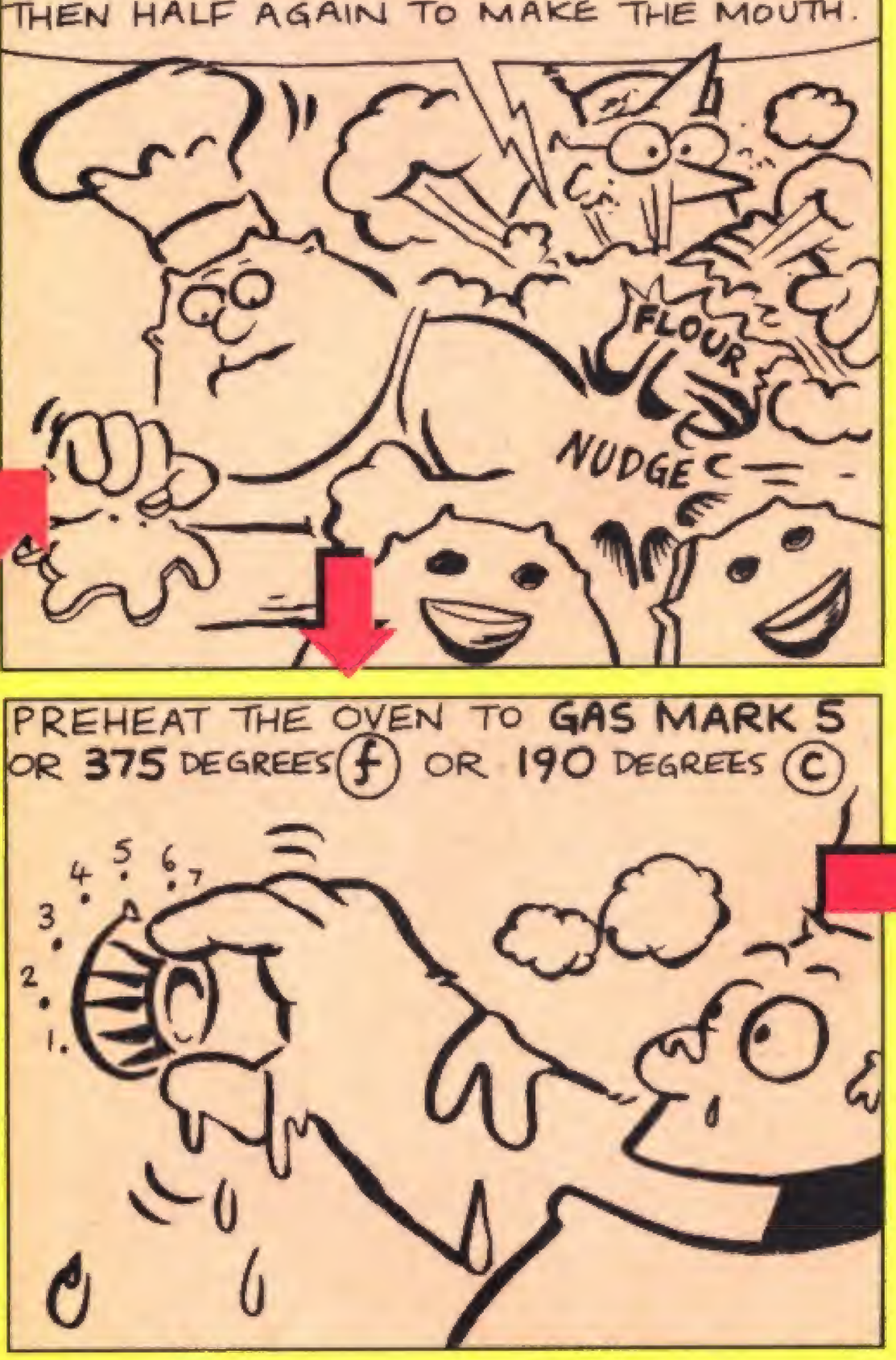


KITCHEN

MAKE YOUR OWN GINGERBREAD ROMS!

USE CURRANTS FOR EYES AND SLICE A CRYSTALISED CHERRY IN HALF – AND THEN HALF AGAIN TO MAKE THE MOUTH.

PREHEAT THE OVEN TO **GAS MARK 5** OR **375** DEGREES (f) OR **190** DEGREES (C)



BAKE YOUR ROMS JUST ABOVE THE CENTRE OF THE OVEN FOR **5-10** MINUTES BY WHICH TIME THEY WILL HAVE SPREAD OUT!

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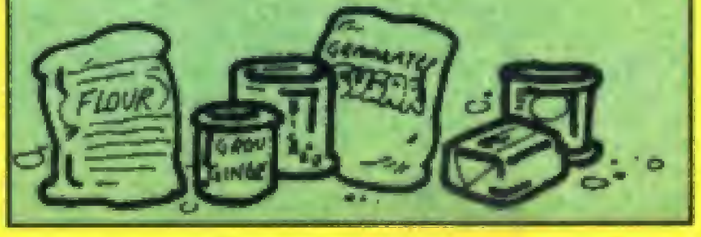

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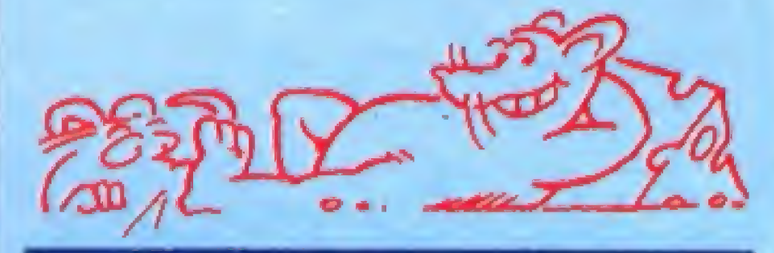

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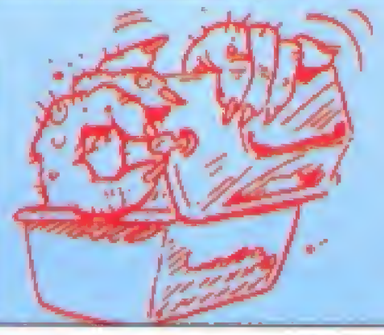

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The search continues for Britain's top...

ALPHABET Artist

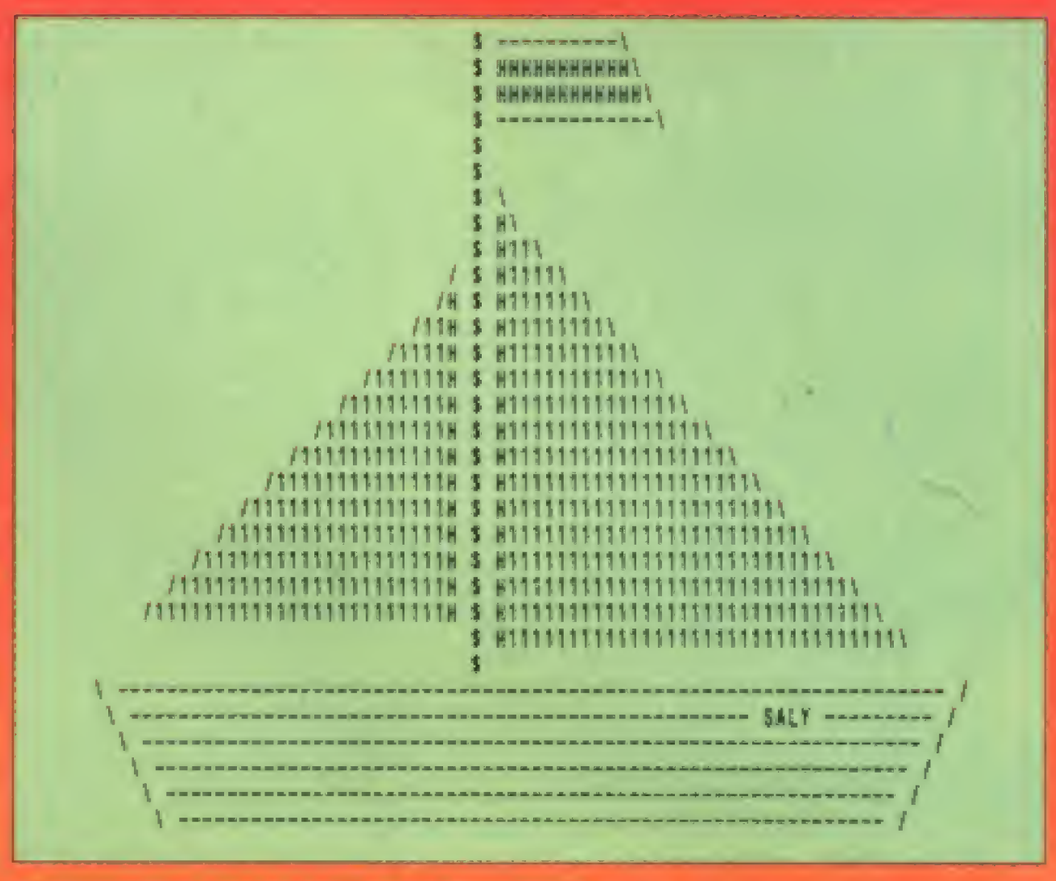
Last month, JANET McKNIGHT launched the Let's Compute! Alphabet Artist contest. Entries are already pouring in – a selection are shown here.

If you haven't sent in yours, start designing now. It's amazing what you can draw using just the letters on your keyboard. Don't worry if you're not good at art. What we're interested in are novel and unusual ways of using the computer's keys to create pictures.

We've plenty of super prizes to give away – and there's even an impressive certificate for EVERYONE who enters.

Just save your picture on disc or tape and send it in – with a printout if possible. Make sure you include the entry form, or a copy of it.

If you want us to send the certificate, as well as return your tape or disc, don't forget to include a stamped addressed envelope.



Boat – Robert Slack, Grovehill, Hemel Hempstead.

Porsche – Paul Louth, Sinfin, Derbyshire.

Clown – Sean Cardus, Runcorn, Cheshire.

WHAT YOU CAN WIN

Every month the sponsor of this great competition, Impact Software, will present FIVE copies of its popular drawing package – Art Studio.

With it you can move from the world of alphabet art into the dizzy world of computer graphics.

PLUS lots more prizes! For the best entry received before November 30 there will be an extra gift from Impact – a voucher worth £50 you can spend as you wish. And there will be TWENTY more vouchers worth £5 each for the next 20 best.

AND £100 FOR YOUR SCHOOL

Impact is also presenting £100 for the best picture we receive that has a school name and teacher's signature on the entry form.

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I would like to enter the Alphabet Artist contest

Name.....

Address .....

.....

.....

Post code .....Age .....

Please complete this section should you wish your school to benefit from our top winner's prize each month.

My school is .....

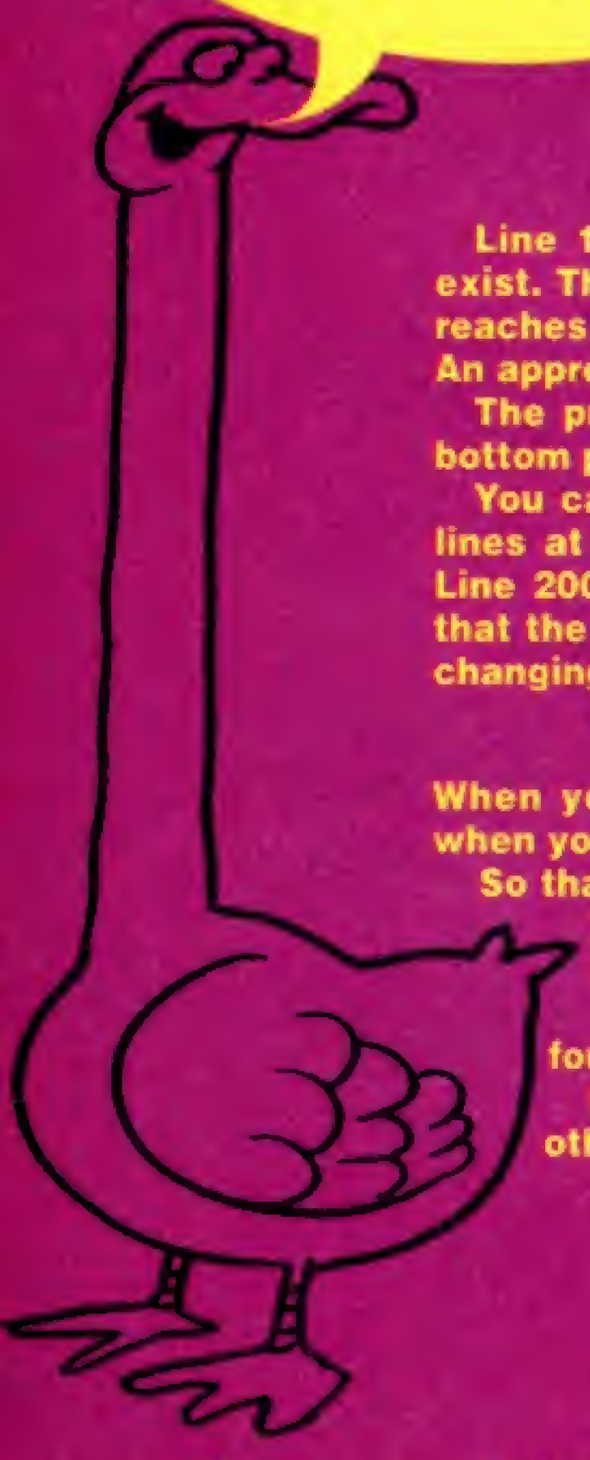
Signature of teacher.....

POST TO: Alphabet Artist, Let's Compute!, Europa House, Adlington Park, Macclesfield SK10 4NP

Watch out for all the winners' names in Let's Compute!

THE PROGRAM DOCTOR

There's ALWAYS a better way of doing things – and here's another rather tatty program that was just crying out for the treatment. So we passed it to our resident medic for a little life-saving surgery



The top program on the right is intended to print a child's score in a test when a name is typed into your computer. It works, but Doc has diagnosed several faults. The main ones are:

- Each PRINT has almost the same text – one would be enough.
- The program doesn't tell you if a child's name isn't found.
- It would be a very long program if you wanted to increase the number of names to, say, 100.
- Last but not least, it just keeps on going. And apart from pressing Escape or Break, there's no way of stopping it.

The middle program cures the first of these ailments by setting up a variable called *score* to the right number once the child's name is discovered in the list. Then Line 140 prints the message score with the right name and score.

But what if the name typed in isn't included in the list? That's no problem – two lines are added to the program to check whether the name has been found. They are:

```
15 s=999
135 IF s=999 THEN PRINT n$;" isn't in my list":GOTO 150
```

Line 15 sets *score* to 999 – a value that can never really exist. Then, if it hasn't been changed by the time the program reaches Line 150 it means that no real score has been found. An appropriate message is then printed.

The problem of adding more names easily is cured by the bottom program of the three. Type it in and try it now.

You can easily add lots more names by putting more DATA lines at the end of the program. If you do you must change Line 200 to say how many lines there are. The final problem that the Doc found on his first examination is simply cured by changing Line 150:

```
150 IF n$<>"NONE" THEN GOTO 10
```

When you want to leave the program you just type NONE when you are asked for a name.

So that's all Doc has time for at the moment. But his operations have introduced another small fault into the program.

You'll find that if you ask for CARL's score it won't be found if you use capital letters.

If you can cure this fault – or diagnose and cure any others – please let the the Program Doctor know.

```
  10 INPUT "Whose score do you want to find";
n$
  20 IF n$="Michael" THEN PRINT "Michael scor
ed 12 out of 15"
  30 IF n$="John" THEN PRINT "John scored 11
out of 15"
  40 IF n$="Chris" THEN PRINT "Chris scored 1
2 out of 15"
  50 IF n$="Robert" THEN PRINT "Robert scored
10 out of 15"
  60 IF n$="Samantha" THEN PRINT "Samantha sc
ored 14 out of 15"
  70 IF n$="Mark" THEN PRINT "Mark scored 9 o
ut of 15"
  80 IF n$="Angela" THEN PRINT "Angela scored
13 out of 15"
  90 IF n$="Edwin" THEN PRINT "Edwin scored 8
out of 15"
 100 IF n$="Carl" THEN PRINT "Carl scored 1 o
ut of 15"
 110 IF n$="Helen" THEN PRINT "Helen scored 1
2 out of 15"
 120 IF n$="Sebastian" THEN PRINT "Sebastian
scored 12 out of 15"
 130 IF n$="Howard" THEN PRINT "Howard scored
14 out of 15"
 140 GOTO 10
```

The original program

```
  10 INPUT "Whose score do you want to find";
n$
  20 IF n$="Michael" THEN s=12
  30 IF n$="John" THEN s=11
  40 IF n$="Chris" THEN s=12
  50 IF n$="Robert" THEN s=10
  60 IF n$="Samantha" THEN s=14
  70 IF n$="Mark" THEN s=9
  80 IF n$="Angela" THEN s=13
  90 IF n$="Edwin" THEN s=8
 100 IF n$="Carl" THEN s=1
 110 IF n$="Helen" THEN s=12
 120 IF n$="Sebastian" THEN s=12
 130 IF n$="Howard" THEN s=14
 140 PRINT n$;" scored ";s;" out of 15"
 150 GOTO 10
```

The Program Doc uses just one PRINT

```
  10 INPUT "Whose score do you want to find";
n$
  15 s=999
  20 RESTORE
  30 READ kids
  40 FOR l=1 TO kids
  50 READ c$,n
  60 IF n$=c$ THEN s=n
  70 NEXT l
 135 IF s=999 THEN PRINT n$;" isn't in my lis
t":GOTO 150
 140 PRINT n$;" scored ";s;" out of 15"
 150 GOTO 10
 200 DATA 12
 210 DATA "Michael",12,"John",11
 220 DATA "Chris",12,"Robert",10
 230 DATA "Samantha",14,"Mark",9
 240 DATA "Angela",13,"Edwin",8
 250 DATA "Carl",1,"Helen",12
 260 DATA "Sebastian",12,"Howard",14
```

The Doc's improved version

Changes for Spectrum Users

- Select 48k mode
- Use **GO TO** instead of **GOTO**
- Replace **THEN s=** with **THEN LET s=**

Do you think YOU'VE written a program that can't be improved? Then send it along to the Program Doctor. He LOVES a challenge!

BBC BASIC WITH ROM & RAM

WHAT ON EARTH HAVE YOU BROUGHT??

JUST A BIT OF GRUB, OH— AND A THREE TON SAFE TO KEEP IT IN!

THAT SHOULD KEEP THOS ANIMALS OUT!

WELL, IF YOU'RE QUITE READY IT'S TIME TO LEARN TO WRITE A PROGRAM - JUST HAVE **TWO** CANS!

O.K! I'M COMING

RIGHT. A PROGRAM CONSISTS OF A SERIES OF LINE NUMBERS AND INSTRUCTIONS. TRY THIS:

>10 PRINT "ROM"

AND PRESS **RETURN**

SHHH!!

NOTHING'S HAPPENED..

TAP

TO GET THE MICRO TO *EXECUTE* A PROGRAM YOU TELL IT TO **RUN**. TYPE IN **RUN** AND PRESS RETURN

```
>10 PRINT "ROM"
>RUN
ROM
>_
```

TRY A LONGER PROGRAM. THE MICRO EXECUTES EACH LINE IN TURN

```
>10 PRINT "RAM"
>20 PRINT "ROM"
>RUN
RAM
ROM
>_
```

WHY LINES 10, 20? WHY NOT LINES 1 AND 2?

BECAUSE IF YOU LEAVE GAPS OF **10** BETWEEN LINE NUMBERS YOU CAN THEN INSERT A LINE IF YOU'VE LEFT SOMETHING OUT

ADD EXTRA LINES —LIKE THIS

```
>5 CLS
>10 PRINT "RAM";
>15 PRINT " IS CLEVER"
>20 PRINT "ROM";
>25 PRINT " IS THICK"
>30 PRINT "O.K?"
>_
```

TYPE **RUN** AND PRESS RETURN

RAM IS CLEVER
ROM IS THICK
O.K?
>_

VERY FUNNY! SO WHERE'S THE PROGRAM GONE?

AH! TO SEE YOUR PROGRAM TYPE **LIST** AND PRESS RETURN

FAILED

GET THE CROWBAR!

THERE IT IS. NOW, IF YOU'VE TYPED IN A WRONG LINE, TO ERASE IT...

```
>LIST
 5 CLS
 10 PRINT "RAM";
 15 PRINT " IS CLEVER"
 20 PRINT "ROM";
 25 PRINT " IS THICK"
 30 PRINT "O.K?"
```

..JUST TYPE IN THE LINE NUMBER AND PRESS RETURN

SLURP!

TYPE IN **15** AND PRESS RETURN. NOW **LIST** THE PROGRAM

```
>15
>LIST
 5 CLS
 10 PRINT "RAM"
 20 PRINT "ROM"
 25 P...
```

YUP! IT'S GONE!

TALKING OF GETTING RID OF THINGS, TRY TYPING IN **NEW** AND PRESS RETURN. THEN TYPE IN **LIST** AND PRESS RETURN

```
>NEW
>LIST
>_
```

HEY! WHERE'S THE PROGRAM GONE?

STRAIN

TYPE IN **OLD** AND PRESS RETURN

THEN **LIST** THE PROGRAM

HEY, IT'S BACK!

```
>OLD
>LIST
 5 CLS
 10 PRINT "RAM";
 20 PRINT "ROM";
 25 PRINT " IS THICK"
 30 PRINT "O.K?"
```

TAP TAP

GOT IT? TYPE IN **NEW** TO START A FRESH PROGRAM, **OLD** IF YOU WANT IT BACK, BUT...

..WATCH OUT THOUGH, ONCE YOU'VE STARTED TYPING ANOTHER PROGRAM, EVEN TYPING **OLD** WON'T GET THE ORIGINAL ONE BACK!

WHILE WE'RE AT IT, TRY THIS: TYPE IN **NEW** AND PRESS RETURN THEN TYPE IN THIS

```
>NEW
>10 CLS
>20 PRINT "ROM"
>30 GOTO 20
>_
```

GOTO IS A COMMAND FOLLOWED BY A LINE NUMBER. WHEN THE MICRO REACHES LINE 30 IT SEES **GOTO 20**. SO IT JUMPS BACK TO LINE 20 AND PERFORMS THAT INSTRUCTION AGAIN, AND AGAIN AND AGAIN...

NOW **RUN** IT

PANIC

WHAT'S **GOTO**?

IT'S NO USE! GET THE TNT!

YOUR JOKING!

NOTE: DON'T USE **GOTO** TOO MUCH. IT'S O.K. FOR SMALL PROGRAMS BUT IN LONG LISTINGS THE FLOW OF THE PROGRAM MAY BE OBSCURED

WHY'S THAT?

ROM
ROM
ROM
ROM
ROM

WELL, IT GET'S HARDER TO SEE WHAT YOUR PROGRAM IS DOING IF YOU ARE LEAPING FROM ONE END OF A PROGRAM TO ANOTHER IT CAN MAKE CORRECTING LISTINGS A NIGHTMARE!

HEY! HOW DO I GET OUT OF THIS TO GET MY LISTING BACK? IS IT BREAK?

NO, BETTER TO USE **ESCAPE**. THIS WILL INTERRUPT A PROGRAM FOR YOU TO **LIST**

PRESS BREAK AND YOU COULD LOSE A PROGRAM

BY THE WAY, IF YOU DO RUN OUT OF LINE NUMBERS USE **RENUMBER**

RENUMBER ON ITS OWN WILL START THE LISTING FROM LINE 10 AND EACH SUCCESSIVE LINE WILL INCREASE BY 10 YOU CAN SPECIFY THE LINE NUMBERS AND GAPS. TRY **RENUMBER 200,2** AND PRESS RETURN. NOW **LIST** IT. 200 IS THE START LINE AND 2 SPECIFIES GAPS OF 2

TELL YOU WHAT ROM, THIS MICRO CAN TELL YOU HOW CLEVER YOU ARE. TRY **RENUMBER 0,0**

)RENUMBER 0,0
silly
)-

OH-HOW BORING! TIME FOR A DRINK

NOW FOR SOMETHING YOU'RE GONNA LIKE ROM... **VARIABLES** AND **INPUT** I MEAN, YOU'RE ALWAYS INPUTTING FOOD AND DRINK!

PUSH FFFF

ANY MORE WISE-CRACKS AND I'M OFF HOME!

ACME SAFE

WHAT'S A VARIABUBBLE THEN?

VARIABLES STORE NUMBERS AND WORDS IN THE MICRO'S MEMORY AND YOU CAN KEEP USING THEM FOR CALCULATIONS AND THINGS.

TRY:

```
5 CLS
10 A=5
20 B=6
30 PRINT A*B
```

THE MICRO NOW KNOWS THAT IT HAS **5** STORED IN VARIABLE **A** AND **6** IN VARIABLE **B**. LINE 30 WILL PRINT THE CONTENTS OF **A** MULTIPLIED BY THE CONTENTS OF **B**

THEN...

WOT THE..

BOOM

IT'S JUST THOSE ANIMALS TRYING TO NICK MY STUFF! HA! SAFE'S TOO STRONG!

INTACT

WHEN YOU'RE READY— DON'T USE BASIC COMMAND WORDS AS VARIABLE NAMES. THE MICRO WILL THINK YOU ARE GIVING IT A COMMAND. AND DON'T HAVE SPACES LIKE THIS

10 BOX 2=5

YES
A=23
BOX=1572
answer=BOX

NO (COMMAND WORD)
CLS=3
A BOX=75
SPACE

TO ENTER INFORMATION INTO A MICRO, USE **INPUT** FOLLOWED BY A **VARIABLE**

EXAMPLES:

```
INPUT A
INPUT box1
INPUT answer
INPUT addnumber
INPUT X
INPUT total
```

TRY THIS LISTING TO MULTIPLY NUMBERS

```
10 CLS
20 PRINT"Give me a number"
30 INPUT num1
40 PRINT"Give me another"
50 INPUT num2
60 PRINT; num1; "X";
70 PRINT, num2, "=",
80 PRINT; num1 * num2
```

AND *THIS* TO CALCULATE YOUR AGE.

```
10 CLS
20 PRINT" YEAR BORN?"
30 INPUT born
40 now=1990
50 age=now-born
60 PRINT"YOU ARE ";
70 PRINT; age
```

MAG

THE MICRO WAITS AT AN **INPUT** FOR YOU TO TYPE SOMETHING IN. IT THEN PUTS THE *VALUE* OF THE NUMBER YOU ENTER INTO THE **VARIABLE** YOU'VE CHOSEN.

YOU CAN ALTER THE VALUE OF A VARIABLE ANY TIME. FOR EXAMPLE:

```
10 age=15
20 PRINT age
30 age=22
40 PRINT age
```

YOU CAN ALTER THE VALUE OF A VARIABLE LIKE THIS →

```
10 age=15
20 PRINT age
30 age=age+7
40 PRINT age
```

NOW TYPE IN **NEW** AND PRESS RETURN

RIGHT! NOW FOR *WORDS*. YOU CAN STORE THEM IN **STRING VARIABLES**. THEY HAVE A **$** SIGN AFTER THEM. TRY:

```
10 A$="ROM"
20 PRINT A$
```

PUT "ROM" INTO A$

PRINT CONTENTS OF A$

↑ TYPE IN. TYPE RUN AND PRESS RETURN

)NEW
)10 A$="ROM"
)20 PRINT A$
)RUN
ROM

COR!

CLICK

NOTE THAT THE WORD TO BE PLACED IN A *STRING VARIABLE* MUST BE IN BETWEEN QUOTATION MARKS

YOU MAY CALL THE **STRING VARIABLE** WHAT YOU LIKE (EXCEPT COMMAND WORDS LIKE PRINT GET ETC) TRY:

```
10 name$="ROM"
20 fact$=" is daft"
30 PRINT name$;
40 PRINT fact$
```

)RUN
ROM is daft
)-

!

STRING VARIABLES CAN BE ADDED TOGETHER TOO. SO, THE LAST EXAMPLE COULD BE:

```
10 name$="ROM"
20 fact$=" is daft"
30 all$=name$+fact$
40 PRINT all$
```

I'M NOT DAFT - HUNGRY YES!

MAG 1990

NOW LET'S COMBINE WHAT WE KNOW INTO A FUN PROGRAM. TRY:

```
10 PRINT "Hi! What's your name?"
20 INPUT name$
30 PRINT "Good morning "; name$
40 PRINT "How old are you?"
50 INPUT age
60 PRINT "So you're "; age; " then "; name$
70 PRINT "That's ROM'S I.Q. aswell!"
```

TYPE IN THE ABOVE
TYPE IN **RUN**
PRESS RETURN

TO EMPTY A STRING VARIABLE IS EASY. IF YOU HAVE name$ = "ROM" THEN DO THIS: name$ = "" WITH NOTHING SEPARATING THE QUOTATION MARKS THIS WILL EMPTY THE VARIABLE name$

NOW, TYPE IN **NEW**, PRESS RETURN AND TYPE IN:

```
10 PRINT "Who are you?"
20 INPUT name$
30 PRINT "Hi "; name$
```

NOT A SCRATCH! GET THE *LASER!*

I KEEP HAVING TO TYPE IN **RUN** TO REUSE THE PROGRAM HOW CAN I KEEP IT GOING WITHOUT DOING THAT?

?

I THINK I KNOW WHAT YOU MEAN. TRY A NEW COMMAND— **GET**

THROBBING DIGITS

ADD LINES 40 TO 70

```
10 PRINT "Who are you?"
20 INPUT name$
30 PRINT "Hi "; name$
40 PRINT "Press a Key"
50 Key = GET
60 CLS
70 GOTO 10
```

LASER HUMMMM

LETTING A VARIABLE *say* Key=GET MAKES THE MICRO WAIT TO GET A RESPONSE FROM YOU

A BIT LIKE INPUT THEN?

YES, EXCEPT WITH **GET** ONCE YOU'VE HIT A KEY THE MICRO CONTINUES WHEREAS *INPUT* WAITS FOR YOU TO PRESS RETURN

SO, I CAN ONLY ENTER *ONE* LETTER OR NUMBER WITH **GET**?

CORRECT! YOU'VE DONE WELL ROM — FOR AN IDIOT! YOU CAN FILL YOUR FACE NOW!

AT LAST! CHEERS RAM! — *MEANIE!*

NOT EVEN A BURN MARK!

TIME FOR A MEGA-FEAST!

I SHOULD BE SO LUCKY...

CLICK!

SWING

AY UP! IT WASN'T LOCKED!

ACE! BRILL! MAGIC!

...LUCKY IN LOVE

ZZZZZZZZZZ

KRISPY RITS

REAL GUNK

LEMON SPARKIE

NEXT MONTH— A FANTASTIC FEAST OF FUN WITH LOADS TO SAVE ON DISC OR CASSETTE!

The program and computer terms used in this article relate to Acorn micros. Readers with an Amstrad CPC, Commodore 64/128, Spectrum, Atari ST or Amiga who order a Gadget Shop pack will be sent complete instructions appropriate to their machines.

Gadget Shop

Come into the Gadget Shop, the place where you'll find lots of exciting ways of using your micro to link up with outside world . . . Building fun-to-use gadgets that work by remote control is easy. And safe. And they can't harm your micro! Let Gadget Shop proprietor Mike Cook tell you all about it

In the Gadget Shop last month we made a link that lets us connect a variety of gadgets to a micro. Now we'll use that link to turn an ordinary coat hanger into a challenging electronic game.

Think you've got a steady hand and nerves to match? Well try this! Build this month's project and find out how you compare with your friends. *But first get in a bit of practice!*

All you need is the connector strip described last month, two pieces off a chock block strip and a resistor (you'll find these in Gadget Shop Pack 1), plus a wire coat hanger, a length of wire and some insulating tape, From these simple bits you can make a game where you have to thread a ring along a wavy piece of wire without the ring touching the wire.

It's easy enough to build but a darned sight harder than you think to play!

You've probably seen this type of game buzzing away at places like school fairs and could well be wondering exactly how

Technospeak . . .

Here's how the Steady Hands game works. You don't need to understand it to have have a lot of fun out of it. But if you do you will find it easier to write your own unique program that goes much beyond what we are doing here.

When the loop is not touching the hanger it is connected to the 5 volt line through the resistor. We say this has a logic 1 on it. However when it does touch it is connected directly to earth and we say it has a logic zero on it.

So what we want to do with our program is to look at the User Port and make a beep if we see a logic 0 on the input. The micro sees the User Port as just another memory location. Each one has an address and at that address is stored a number.

In the case of the User Port this number will consist of the logic levels currently being fed into it.

To find out what is involved you need to use what is known as an indirection operator.

The one we need is shown by a question mark.

Whenever you see a ? in a program read it to yourself as if it says *'the contents of.'*

So, ?&FFFF is read as *the contents of memory location &FFFF.* (The & shows that the address is in hexidecimal notation or number base 16.)

On the 8 bit BBC Micro and Master series the address of the User Port is &FE60.

So to read the logic levels on the User Port we need to have this line in our program:

```
A%=?&FE60
```

This should be read as *Let the variable A% equal the contents of memory location FE60.*

Now the value A% is made up from all the inputs on the User Port.

IN THE SHOP SOON: DIY BURGLER ALARMS ●

The software

Here's the simple routine that makes the micro beep every time loops touch:

```
10 REPEAT:PROCcheck:UNTIL FALSE
20 DEFPROCcheck
30 LET A%=?&FE60
40 A%= A% AND 1
50 IF A%=0 THEN VDU 7
60 ENDPROC
```

You can use PROCcheck in your own programs. If you're interested in exactly how the important bits of this work, it's all explained in the Technospeak panel.

As we've said, this is a very simple program. And that's where you come in.

Can you alter it to make a different sound? How about making the micro work out how long it takes to pass the hanger through the loop using the TIME variable? In short, this is your template program to modify and make your own.

If you write a good one, send it to *Let's Compute!* We'll give super baseball caps for any we print.

a computer comes into it.

Well, instead of just getting the usual buzz each time the ring touches the wire, you can record the number of 'collisions' and the time taken to complete the game.

You can even connect up to eight loops to your micro and have a race with your friends.

Now let's get down to making the hardware. Start by using a pair of heavy pliers to cut the end off the coathanger at the point where it is twisted together. Then bind the end with tape up to the shoulder of the coat hanger.

Now take the hook you have just cut off and use it to make a small loop with a short handle. It's best to bend the wire with two pairs of pliers – one to hold it and the other to bend it. Remember to first fit it round the main wire of the coat hanger.

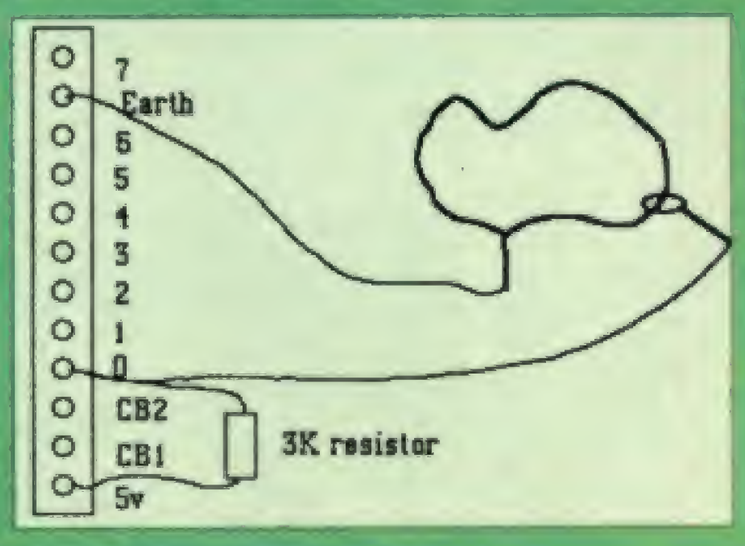
The final stage before we connect it to the computer is to bend the big wire into an interesting wavy shape.

Next, we need to join it to the Earth terminal on the connector block.

The wire loop itself is joined to input No. 0. To do this first connect wires to the two separate parts of the coat hanger. You should use two screw connectors cut from a piece of the chock block.

Join the other ends of the wires to the connector as shown in the diagram below.

Finally, on the connector you should link a 3K resistor between input 0 and the 5v terminal. The resistor can be anything from 1K to about 47K.



Is this YOUR computer?

Archimedes and BBC A3000: You need an i/o podule. The program also needs to be changed – you can get at the User Port by using one of the operating system calls.

In this case replace Line 30 with the line:

```
SYS "OS Byte",150,&60 TO ,,A%
```

Note that the two commas after the TO are essential.

Electron: You need a Plus One and User Port expansion – available from Pres (0276 72046).

The game and program work as they are described above except that the memory location which is accessed by the User Port is &FCB0. So wherever you see &FE60 in the text you use &FCB0

Spectrum: You need an interface 1 and the gadget connects to the joystick port*.

Amstrad CPC, Commodore 64/128, Amiga and ST: The gadget connects to the joystick port*.

** Full assembly instructions are in Gadget Shop Pack 1, and the short Basic routine to operate the gadget will be supplied when you order the pack.*

We want to extract the information from just one bit – bit 0. To do this we use the AND operator like this:

```
A% = A% AND 1
```

This leaves the variable A% containing just bit 0 from the User Port. So it will be equal to 1 if we have no contact with the loop and 0 if the loop is touching the hanger.

● ***Users of other micros: See panel above.***

NEXT MONTH

Get ready for the dark nights – make a burglar alarm! All you need is the Gadget Shop connector and a few bits and pieces you can get from any good DIY store – or direct from The Gadget Shop itself.

Your burglar alarm kit has lots of other uses. The same techniques that we'll be describing can keep track of the positions of trains on a model railway or make a wide variety of electronic games.

We'll supply the basic ideas. You build on them to make the device you want.

GADGET SHOP ORDER FORM

Pack 1 – User Port connector cable

Contains all the bits you need to connect future Gadget Shop projects to the User Port – PLUS the extra parts required for next month's project. *Show what you want by ticking the correct box below.*

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BBC B+/Master 80 Track		2241		2244		2250
Atari ST		9192		9193		9194
Amiga		9842		9843		9844
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WOW!

We're being invaded — by TURTLES!

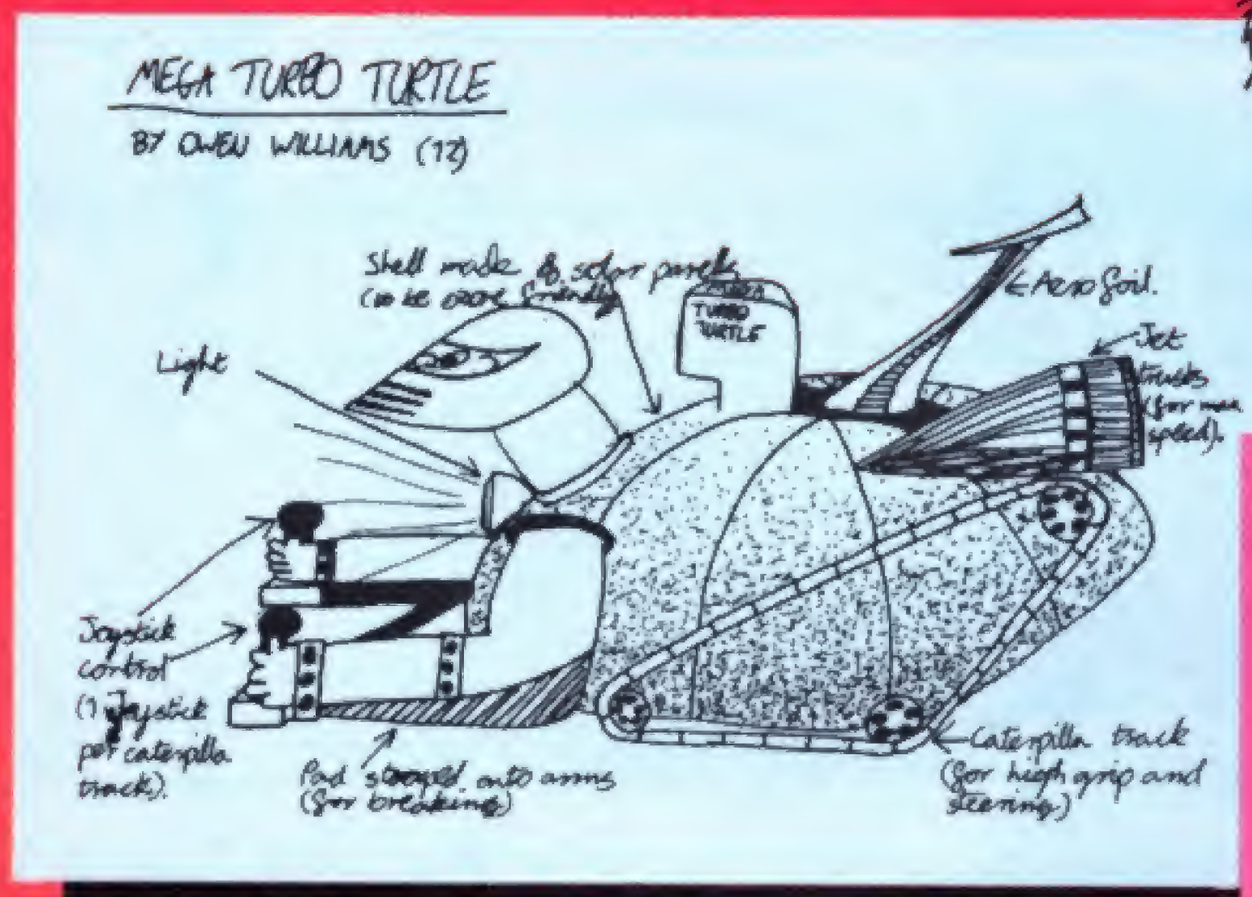
In last month's *Let's Compute!* Mike Goldberg (right) issued a challenge. Britain's top turtle cartoonist asked YOU to design your own Supa TurboTurtle.

Hundreds of you took him at his word, and we've been flooded out by the creatures!

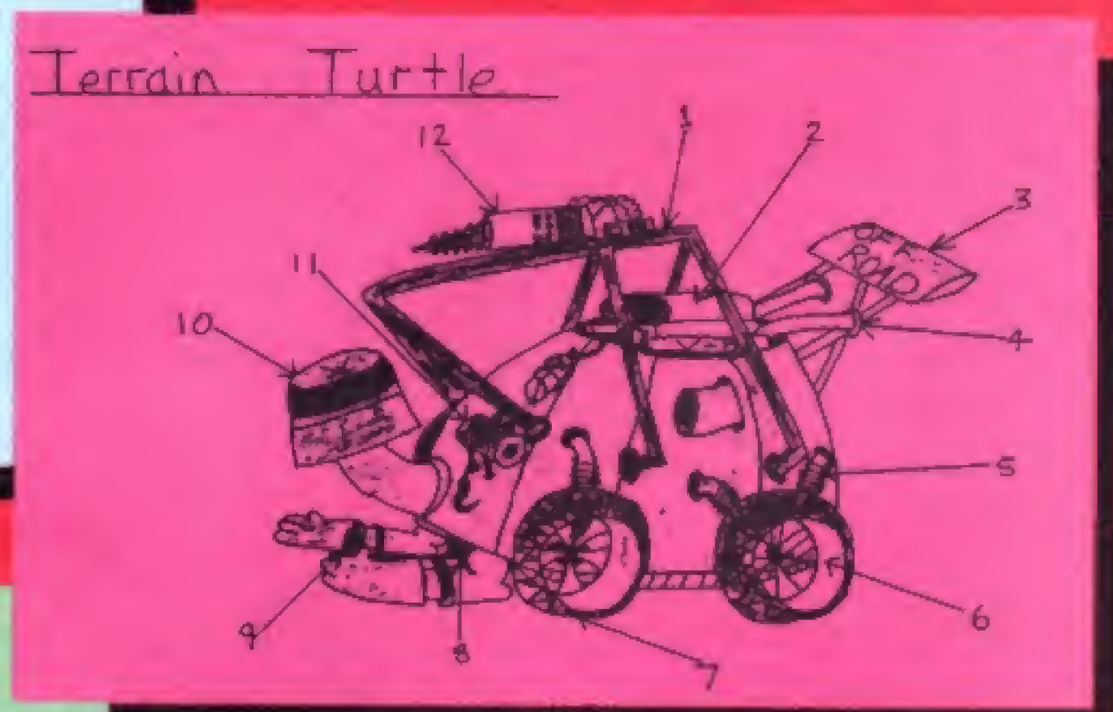
Some of them are printed here. But we've got time to wait until the closing date (August 31) before we can start judging.

In the next *Let's Compute!* we should be able give you the name of the winner.

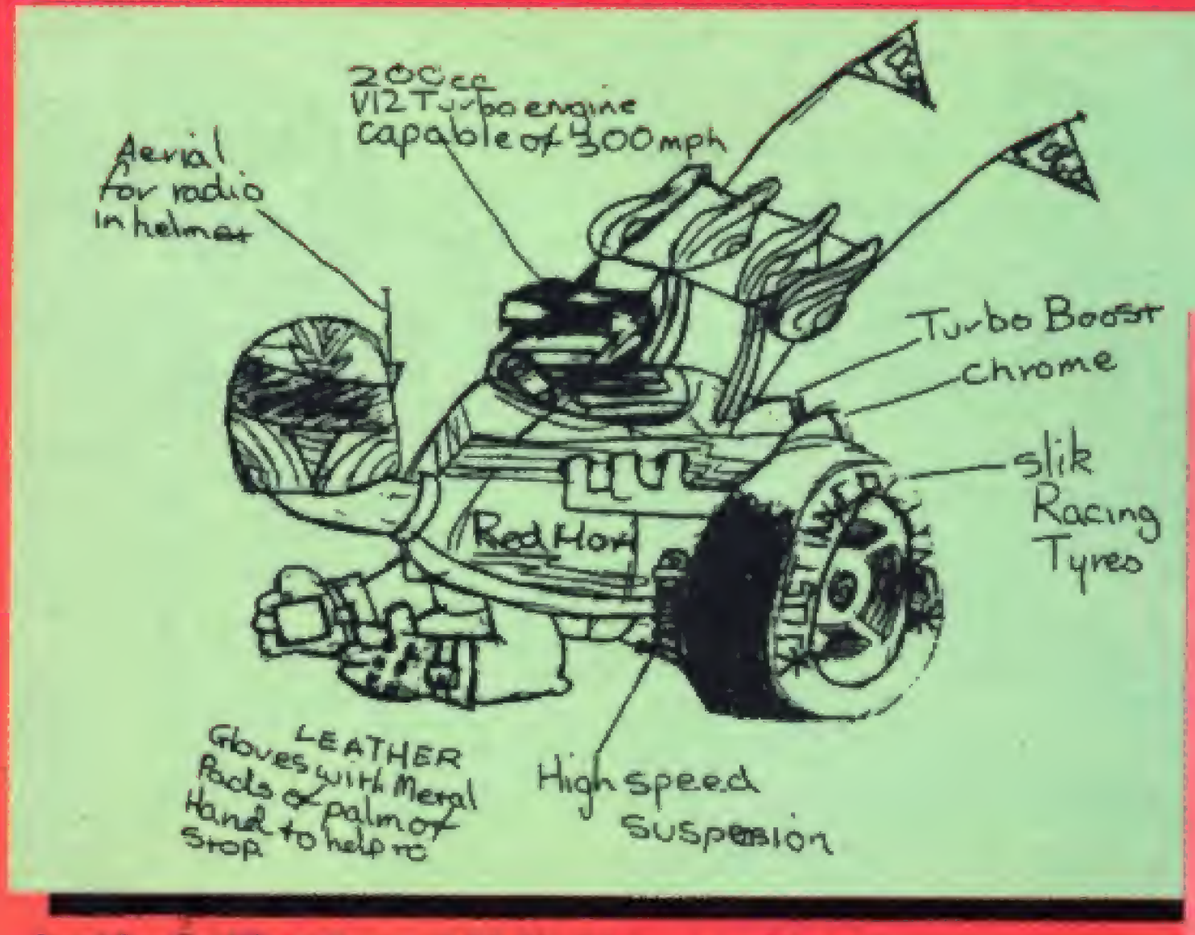
And we'll also be announcing yet ANOTHER Mike Goldberg challenge!



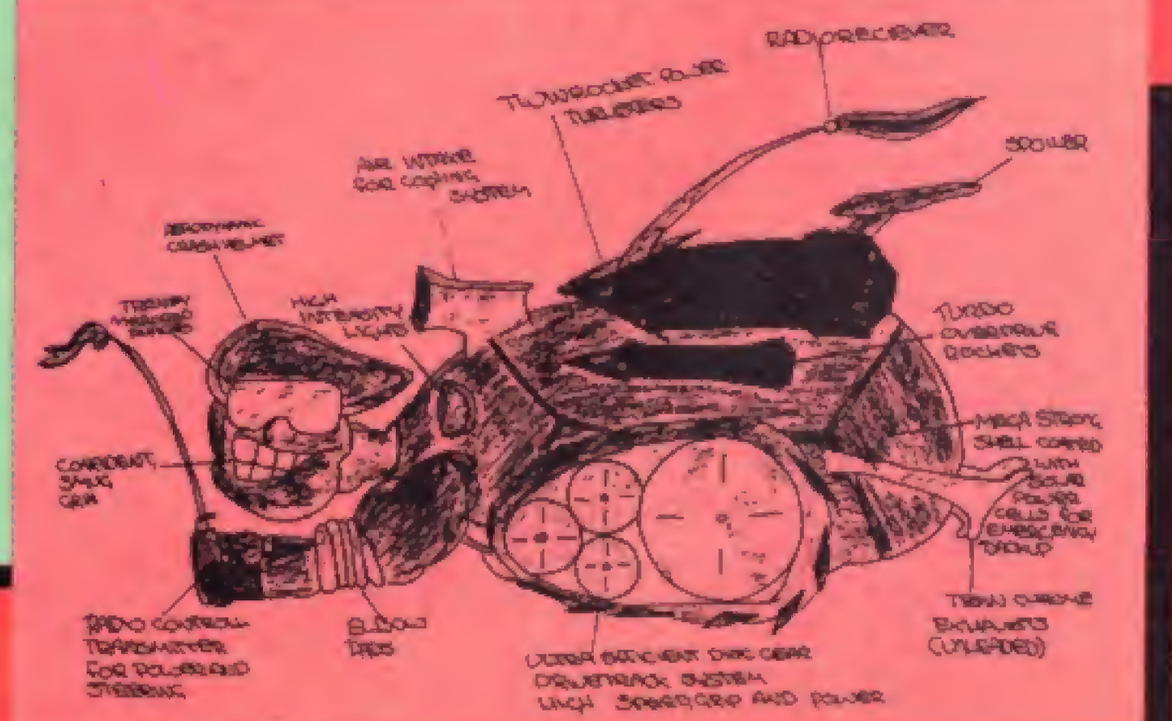
Owen Williams (age 12) Halstead, Essex.



Noel Reeve (age 14) Chelmsford, Essex.



Justin Collins (age 11) Maidstone, Kent.



Matthew Harley (age 12)
Newtown, Derbyshire

'ERE WE GO!
'ERE WE GO!
'ERE WE GO!

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4 Derek ____

1 Pete ____

2 Mark ____

1 Pete ____

1 Pete ____

If you want to organise your own knockout competition for any sport – or just keep track of a big international event – this is THE program you've been waiting for.

Start by keying in the names of the teams. You will be given the opportunity of deciding which teams are to compete with each other – or whether you would like the computer to make the decision for you.

Just type in the correct program for your micro, SAVE it and you're ready to RUN. Now let's look at how you use the program.

First you are asked to enter the number of teams in the competition. As it's a knockout, this must be 4, 8 or 16.

Next you have to enter the teams' names. The computer will allocate a number to each team and this will remain with it throughout the competition.

Once you've typed in all the teams you're asked to check if they're OK. Answer N if you want to correct any mistakes or have had second thoughts about whatever you entered.

Now it's decision time again!

You'll be asked whether you want to keep the teams in the order you typed them in or have them shuffled. (Say 'No' if the draw has already been made.)

If you organise your own knockout – such as a conker competition – it's best to have the names shuffled.

The knockout chart is then displayed. All you have to do now is enter a team's number to move it through to the next round.

Just keep entering teams' numbers until the competition is won. If you accidentally give a wrong number for a winner, type the correct one and it will be replaced. The display may be upset slightly, but it can be completely redrawn by entering C in place of a team number.

Entering S at any time while the chart is displayed will output it to a printer – providing you've got your own printer dump routine.

We wrote this program following a suggestion from 13-year-old Matthew Steele, who has helped us with the design and testing the software.

If you would like us to convert YOUR ideas to a micro and print the program in Let's Compute! just send them in.

If we like them we'll contact you and then work together on the project.

Don't forget to include your address and phone number.

THE PROGRAM

This is for the BBC Micro, Electron and Archimedes

```
100 REM BBC/Electron/Archimedes Knockout
110 REM By Pete Davidson
120 REM (c) Let's Compute!
130 MODE0:PROClets:num=RND(-TIME)
140 width=250:l$=STRING$(15,"_")
150 PROCin:PROCdisplay:PROCok
160 PROCyesno("Do you want to shuffle
the teams?"):IF yes PROCmix(max):CLG
170 REPEAT PROCdisplay:PROCsearch
180 UNTIL team$(0,vert+1)<>""
190 CLG:PROCdisplay:PROCyesno("Knockou
t has been won... Another go?")
200 IF yes RUN ELSE CLS:END
210 DEFPROCdisplay
220 col=1:horiz=0:gap=900/max
230 PROCscreen(max)
240 ENDPROC
250 DEFPROCscreen(max)
260 top=max:CLS:PROClets:VDU5
270 REPEAT
280 PROCdraw(gap,horiz,top,col)
290 col=col+1:top=top/2:gap=gap*2
300 horiz=horiz+width
310 UNTILtop<1
320 vert=col-2:VDU4
330 ENDPROC
340 DEFPROCsearch
350 INPUTTAB(0,31)"Enter winner's numb
er "num$
360 IFnum$="C" OR num$="c" CLG:PROCdis
play:GOTO350
370 IFnum$="S" OR num$="s" PRINT:PRINT
:PRINT:PRINT:PRINT:PROCdump:GOTO350
380 num=VALnum$:verty=col-2:fnd=FALSE
390 REPEAT
400 FORloop=0TOmax
410 IFVAL(team$(loop,verty))=num team$
(loop/2,verty+1)=team$(loop,verty):fnd=T
RUE
420 NEXT:verty=verty-1:UNTIL fnd
430 ENDPROC
440 DEFPROCdraw(gap,horiz,number,col)
450 FORloop=0TOnumber-1
460 x=horiz:y=1023-gap/2-gap*loop
470 GCOL0,0:MOVEx,y:PRINTl$:GCOL0,1
480 MOVEx,y
490 IFteam$(loop,col)<>""PRINTteam$(lo
op,col) ELSE PRINTl$
500 NEXT
510 ENDPROC
520 DEFPROCmix(high)
530 FORloop=1TOhigh
540 array$(loop)=team$(loop-1,1)
550 NEXT
560 REPEAT
570 rnum=RND(high)
580 team$(high-1,1)=array$(rnum)
590 FORloop=rnum TO high-1
600 array$(loop)=array$(loop+1)
610 NEXT:high=high-1:UNTILhigh=1
620 team$(0,1)=array$(1)
630 ENDPROC
640 DEFPROClets
650 COLOUR129:COLOUR0
660 VDU28,65,5,75,1:CLS:PRINT'" Lets"
'" Compute!"'" Knockout"
670 VDU28,0,31,79,29:CLS
680 ENDPROC
690 DEFPROCin
700 REPEAT
710 INPUT"How many teams are in the co
mpetition? "max
720 UNTILmax=40Rmax=80Rmax=16:PRINT
730 DIMteam$(max,5),array$(max+1)
740 FORloop=0TOmax-1
750 PRINT"What is team number "STR$(lo
op+1);:INPUT"? "team$
760 PROCconvert
770 NEXT
780 ENDPROC
790 DEFPROCok
800 PROCyesno("Are these ok?")
810 IF yes GOTO870
820 INPUT'"Which number is wrong? "num
830 IFnum<1 OR num>max GOTO820
840 INPUT'"What should it be? "team$
850 loop=num-1:PROCconvert
860 CLG:PROCdisplay:GOTO800
870 ENDPROC
880 DEFPROCconvert
890 team$=RIGHT$(" "+STR$(loop+1),2)+"
"+team$
900 team$(loop,1)=team$+STRING$(15-LEN
(team$),"_")
910 ENDPROC
920 DEFPROCyesno(ques$):yes=FALSE
930 REPEATPRINT'ques$" ";:key$=GET$:PR
INT
940 IFkey$="S" OR key$="s" PRINT:PRINT
:PRINT:PRINT:PRINT:PROCdump
950 UNTIL INSTR("YyNn",key$)<>0
960 IFINSTR("Yy",key$)>0 yes=TRUE
970 ENDPROC
980 DEFPROCdump
990 REM Put your own dump here
1000 ENDPROC
```

Programs for the Commodore 64/128 and Spectrum are overleaf

C64/128 version

```
  100 REM C64/128 KNOCKOUT
  120 L$="_______":CX=211:CY=21
4:CP=58732
  130 POKE 53280,0:POKE 53281,0:
PRINT CHR$(5);:GOSUB 5000
  140 GOSUB 6000:GOSUB 5000:GOSU
B 500:GOSUB 7000
  150 QUES$="DO YOU WANT TO SHUF
FLE THE TEAMS?":GOSUB 9000
  160 IF YES=1 THEN GOSUB 4000
  170 GOSUB 500:GOSUB 2000
  180 IF TEAM$(1,4)="" THEN 170
  190 GOSUB 500:QUES$="KNOCKOUT
HAS BEEN WON... ANOTHER GO?":GOS
UB 9000
  200 IF YES=1 THEN RUN
  210 PRINT CHR$(147);:END
  500 REM Display
  505 POKE 781,21:SYS 59903
  510 PX=1:PY=3:IF VAL(TEAM$(1,1
))=0 THEN PY=4:GOTO 530
  520 PM=8:SK=2:CO=1:GOSUB 700:P
X=PX+10:PY=4
  530 PM=4:SK=4:CO=2:GOSUB 700:P
X=PX+10:PY=6
  540 PM=2:SK=8:CO=3:GOSUB 700
  550 POKE CX,PX+10:POKE CY,10:S
YS CP:IF VAL(TEAM$(1,4))=0 THEN
PRINT L$;:RETURN
  560 PRINT TEAM$(1,4);:RETURN
  700 FOR N=1 TO PM
  710 POKE CX,PX:POKE CY,PY:SYS
CP
  720 IF VAL(TEAM$(N,CO))=0 THEN
PRINT L$;:GOTO 740
  730 PRINT TEAM$(N,C0);
  740 PY=PY+SX:NEXT:RETURN
 2000 REM SEARCH
 2010 POKE CX,1:POKE CY,21:SYS C
P:INPUT "ENTER WINNER'S NUMBER";
NUM$
 2020 IF NUM$="C" THEN GOSUB 500
:GOTO 2010
 2030 IF NUM$="S" THEN GOSUB 950
0:GOSUB 500:GOTO 2010
 2040 NUM=VAL(NUM$)
 2050 IF TEAM$(1,3)<>"" AND TEAM
$(2,3)<>"" THEN X=3:GOTO 2090
 2060 X=2:FOR N=1 TO 4:IF TEAM$(
N,X)="" THEN 2080
 2070 NEXT:GOTO 2090
 2080 X=1
 2090 FOR N=1 TO 8
 2100 IF VAL(TEAM$(N,X))=NUM THE
N 2160
 2110 NEXT
 2120 IF X=1 THEN RETURN
 2130 X=X-1:FOR N=1 TO 8
 2140 IF VAL(TEAM$(N,X))=NUM THE
N 2160
 2150 NEXT:RETURN
 2160 TEMP$=TEAM$(N,X):X=X+1:N=I
NT((N+1)/2)
 2170 TEAM$(N,X)=TEMP$
 2180 RETURN
 4000 REM MIX
 4010 DUMMY=RND(-TIME)
 4020 MX=1:IF MAX=4 THEN MX=2
 4030 FOR N=1 TO MAX
 4040 TEMP$=TEAM$(N,MX)
 4050 R=INT(RND(0)*MAX)+1
 4060 TEAM$(N,MX)=TEAM$(R,MX)
 4070 TEAM$(R,MX)=TEMP$
 4080 NEXT
 4090 RETURN
 5000 PRINT CHR$(147)"       LE
T'S COMPUTE! KNOCKOUT"
 5010 RETURN
 6000 PRINT:PRINT:PRINT
 6020 PRINT CHR$(145)"HOW MANY T
EAMS ARE IN THE COMPETITION ";:I
NPUT MAX
 6030 IF MAX<>4 AND MAX<>8 THEN
6020
 6040 DIM TEAM$(8,4)
 6050 GOSUB 5000:PRINT:PRINT
 6060 FOR LOOP=1 TO MAX
 6070 PRINT "WHAT IS TEAM NUMBER
"STR$(LOOP);:INPUT " ";TEAM$
 6080 GOSUB 8000:NEXT
 6090 RETURN
 7000 REM OK
 7010 QUES$="ARE THESE OK?":GOSU
B 9000
 7020 IF YES=1 THEN RETURN
 7030 POKE 781,21:SYS 59903
 7040 POKE CX,1:POKE CY,21:SYS C
P
 7050 INPUT "WHICH NUMBER IS WRO
NG";NUM
 7060 IF NUM<1 OR NUM>MAX THEN 7
030
 7070 POKE CX,1:POKE CY,22:SYS C
P
 7080 INPUT "WHAT SHOULD IT BE";
TEAM$
 7090 FOR N=1 TO 8
 7100 IF VAL(TEAM$(N,1))=NUM THE
N LOOP=N:N=1:GOSUB 8000:GOTO 720
0
 7110 NEXT
 7120 FOR N=1 TO 4
 7130 IF VAL(TEAM$(N,2))=NUM THE
N LOOP=N:N=2:GOSUB 8000:GOTO 720
0
 7140 NEXT
 7200 GOSUB 500:POKE 781,21:SYS
59903:POKE 781,22:SYS 59903
 7210 GOTO 7010
 8000 IF LEN(TEAM$)>6 THEN TEAM$
=LEFT$(TEAM$,6):GOTO 8020
 8010 TEAM$=TEAM$+LEFT$(L$,6-LEN
(TEAM$))
 8020 TEAM$=RIGHT$(STR$(LOOP),1)
+" "+TEAM$
 8030 N=1:IF MAX=4 THEN N=2
 8040 TEAM$(LOOP,N)=TEAM$
 8050 RETURN
 9000 REM YES/NO
 9010 YES=0
 9020 POKE CX,1:POKE CY,21:SYS C
P
 9030 PRINT QUES$+" ";
 9040 GET A$:IF A$="" THEN 9040
 9050 IF A$="S" THEN GOSUB 9500
 9060 IF A$<>"Y" AND A$<>"N" THE
N POKE 781,21:SYS 59903:GOTO 902
0
 9070 IF A$="Y" THEN YES=1
 9080 RETURN
 9500 REM PRINT-OUT
 9510 REM PUT YOUR OWN DUMP HERE
 9520 RETURN
```

Spectrum version

```
  100 REM Spectrum Knockout
  130 GO SUB 640: RANDOMIZE
  140 LET wide=6: LET s$="  ___
"
  150 GO SUB 690: GO SUB 210: GO
 SUB 790
  160 LET q$="Do you want to shu
ffle the teams": GO SUB 920: IF
yes=true THEN LET high=most: GO
SUB 520: CLS
  170 GO SUB 210: GO SUB 340
  180 IF t$(1,vert+1)=s$ THEN GO
 TO 170
  190 GO SUB 210: LET q$="Knocko
ut has been won...          Anothe
r go?": GO SUB 920
  200 IF yes=true THEN RUN
  205 STOP
  210 REM display
  220 LET col=1: LET horiz=0: LE
T gap=16/most
  230 GO SUB 250
  240 RETURN
  250 REM screen
  260 LET top=most: GO SUB 640
  280 LET number=top: GO SUB 440
  290 LET col=col+1: LET top=top
/2: LET gap=gap*2
  300 LET horiz=horiz+wide
  310 IF top>=1 THEN GO TO 280
  320 LET vert=col-2
  330 RETURN
  340 REM search
  350 INPUT "Enter winner's numb
er"; l$
  370 IF l$="S" THEN GO SUB 980:
 GO TO 350
  375 LET num=VAL (l$): IF num<1
 OR num>most THEN GO TO 350
  380 LET verty=col-2: LET found
=false
  400 FOR l=0 TO most
  410 LET z$=t$(l+1,verty,1 TO 2
): IF z$(2) <"0" OR z$(2) > "9"
THEN LET z$="00"
  415 IF VAL z$=num THEN LET t$(
1+INT (l/2),verty+1)=t$(l+1,vert
y): LET found=true
  420 NEXT l: LET verty=verty-1:
 IF found=false THEN GO TO 400
  430 RETURN
  440 REM draw
  450 FOR l=0 TO number-1
  460 LET x=horiz: LET y=gap/2+g
ap*l
  470 LET z=0: LET z$=t$(l+1,col
,1 TO 2): IF z$="  " THEN LET z=
1
  480 PAPER 1: PRINT AT y,x;t$(l
+1,col,1 TO 2);: PAPER z: PRINT
t$(l+1,col,3 TO )
  500 NEXT l
  510 RETURN
  520 REM mix
  530 FOR l=1 TO high
  540 LET a$(l)=t$(l,1)
  550 NEXT l
  570 LET rnum=INT (RND*high+1)
  580 LET t$(high,1)=a$(rnum)
  590 FOR l=rnum TO high-1
  600 LET a$(l)=a$(l+1)
  610 NEXT l: LET high=high-1: I
F high>1 THEN GO TO 570
  620 LET t$(1,1)=a$(1)
  630 RETURN
  640 REM lets
  650 BORDER 1: PAPER 1: CLS : P
APER 7: INK 4
  660 PRINT AT 1,24;"Let's   ":
PRINT AT 2,24;"Compute!": PRINT
AT 3,24;"Knockout"
  670 PAPER 0: INK 7
  675 LET true=-1: LET false=0
  680 RETURN
  690 REM in
  710 INPUT "How many teams? ";m
ost
  720 IF most<>16 AND most<>8 AN
D most<>4 THEN GO TO 710
  730 DIM t$(most+1,6,6): DIM a$
(most+1,6)
  740 FOR l=0 TO most-1
  750 INPUT "What is team number
"+STR$ (l+1)+"? ";i$
  760 GO SUB 880
  765 FOR i=2 TO 5: LET t$(l+1,i
)=s$: NEXT i
  770 NEXT l
  780 RETURN
  790 REM ok
  800 LET q$="Are these ok?": GO
 SUB 920
  810 IF yes=true THEN GO TO 870
  820 INPUT "Which number is wro
ng?";num
  830 IF num<1 OR num>most THEN
GO TO 820
  840 INPUT "What should it be?"
;i$
  850 LET l=num-1: GO SUB 880
  860 GO SUB 210: GO TO 800
  870 RETURN
  880 REM convert
  890 LET x$=STR$ (l+1): IF LEN
x$=1 THEN LET x$=" "+x$
  900 LET t$(l+1,1)=(x$+i$+"
  ") (1 TO 6)
  910 RETURN
  920 REM yes no
  925 LET yes=false
  930 PRINT #0,AT 0,0;q$;
  935 LET x$=INKEY$: IF x$<>"y"
AND x$<>"Y" AND x$<>"n" AND x"<>
"N" AND x$<>"s" and x$<>"S" THEN
 GO TO 935
  940 PRINT #0,x$: IF x$="s" OR
x$="S" THEN GO SUB 980: GO TO 93
0
  960 IF x$="Y" OR x$="y" THEN L
ET yes=true
  970 RETURN
  980 REM dump
  990 COPY
 1000 RETURN
```

THERE'S MORE!

Versions of the program have also been written for the Amstrad CPC and the Atari ST using STOS. If you would like to receive the listing send a stamped addressed envelope to:

Soccer Listing
Let's Compute!
Europa House
Adlington Park
Macclesfield
SK10 5NP

PENDOWN LOWDOWN

Two of our team of junior reviewers have been trying out a new version of a popular word processor

Stuart and Hannah are pupils at Bradwell Village Middle school in Milton Keynes. They are both 10 years old. And like children in all primary schools, they spend some of their time using a computer.

One of the things they like to do most is use the PenDown word processor on a BBC B. Both of them have used it to write loads of stories and poems.

Recently the school got a BBC A3000. The children were very excited when they had a chance to have a go on the new version of PenDown. But first they had to get used to using a mouse.

It was easy for Stuart – he has a mouse on his Atari at home. But for Hannah this was something completely new.

"I found it a bit hard at first," she says. "But you soon get used to it. And it is much quicker for moving the cursor around the screen".

Stuart and Hannah started by typing in a few nursery rhymes and found this was just like using the old machine. But how much different things were when they went back to correct their mistakes.

Now they could use the A3000's mouse to move a pointer around their writing, first pointing to a mistake and then clicking the mouse button. They were then ready to start correcting the text.

They decided to change the size of the letters in one of the rhymes. First they marked the rhyme they wanted.

They did this by clicking the left button of the mouse at the start of the text and the right button at the end.

This made all the writing in the rhyme go white on black on the screen so it showed clearly the part they had marked.

Then they pointed at the word FONT at the top of the screen. This displayed the font menu. It was now easy to change the shape and size of the letters.

They decided to make the letters much bigger. This took just a couple of mouse clicks.

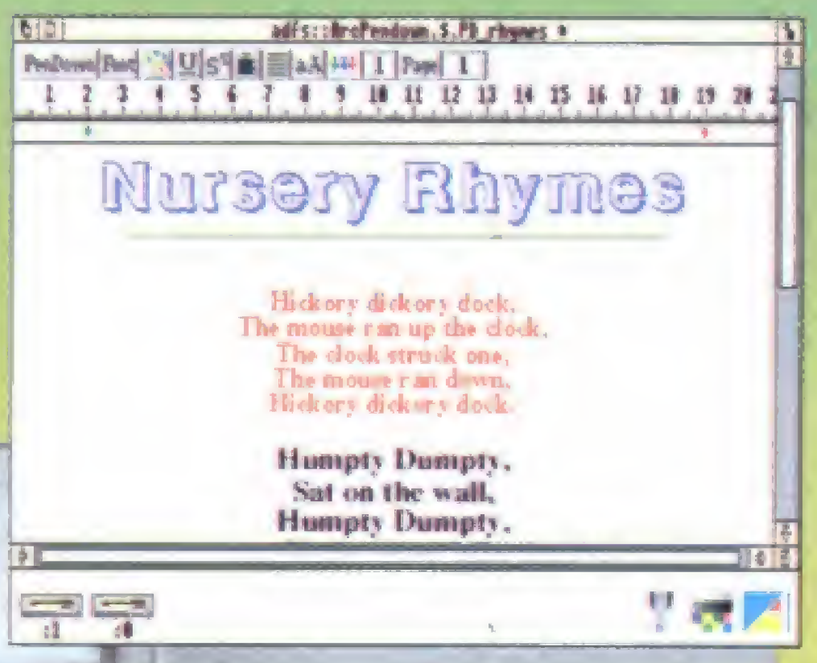
Then they wanted to try out the colours. Again they marked a rhyme and this time went to the colour icon. This showed a little picture of a paint palette. With a couple of clicks they turned Hickory Dickory red.

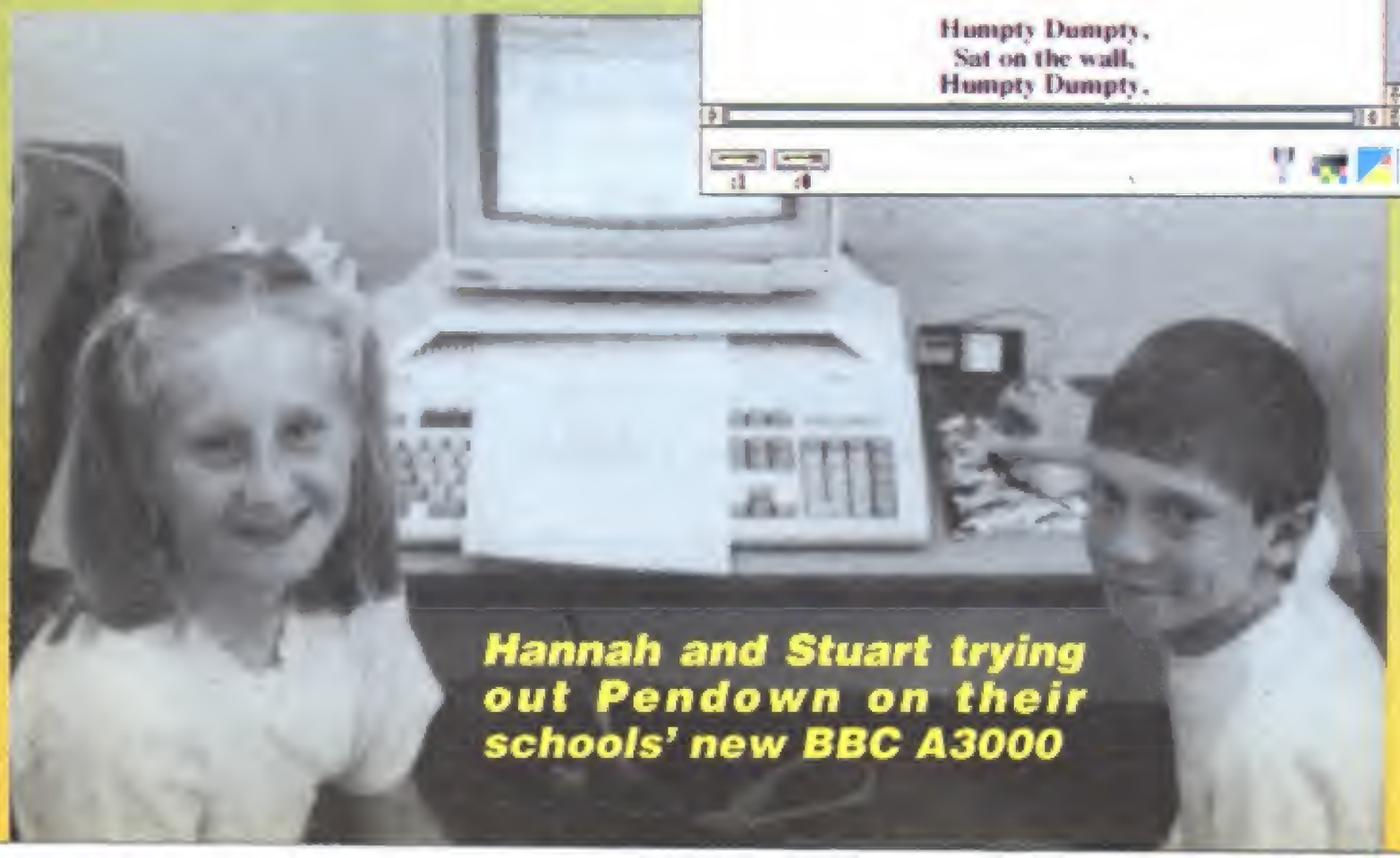
Now they were really moving. Soon they had produced a big coloured title in a new font. They also underlined it. And to finish it off they centred all the text.

It looked really good.

Stuart said: "This new PenDown is a great improvement on the BBC Micro version. It uses colour and you can mix the fonts ever so easily".

Hannah added: "It's really great, I can't wait to start writing my own stories on this. They'll look really good pinned up on the wall".





Hannah and Stuart trying out Pendown on their schools' new BBC A3000

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How a comp

Micros are magic.
about a computer
over almost everyon
What we're goi
***Compute!* over the**
take you on a tour
And show you just w

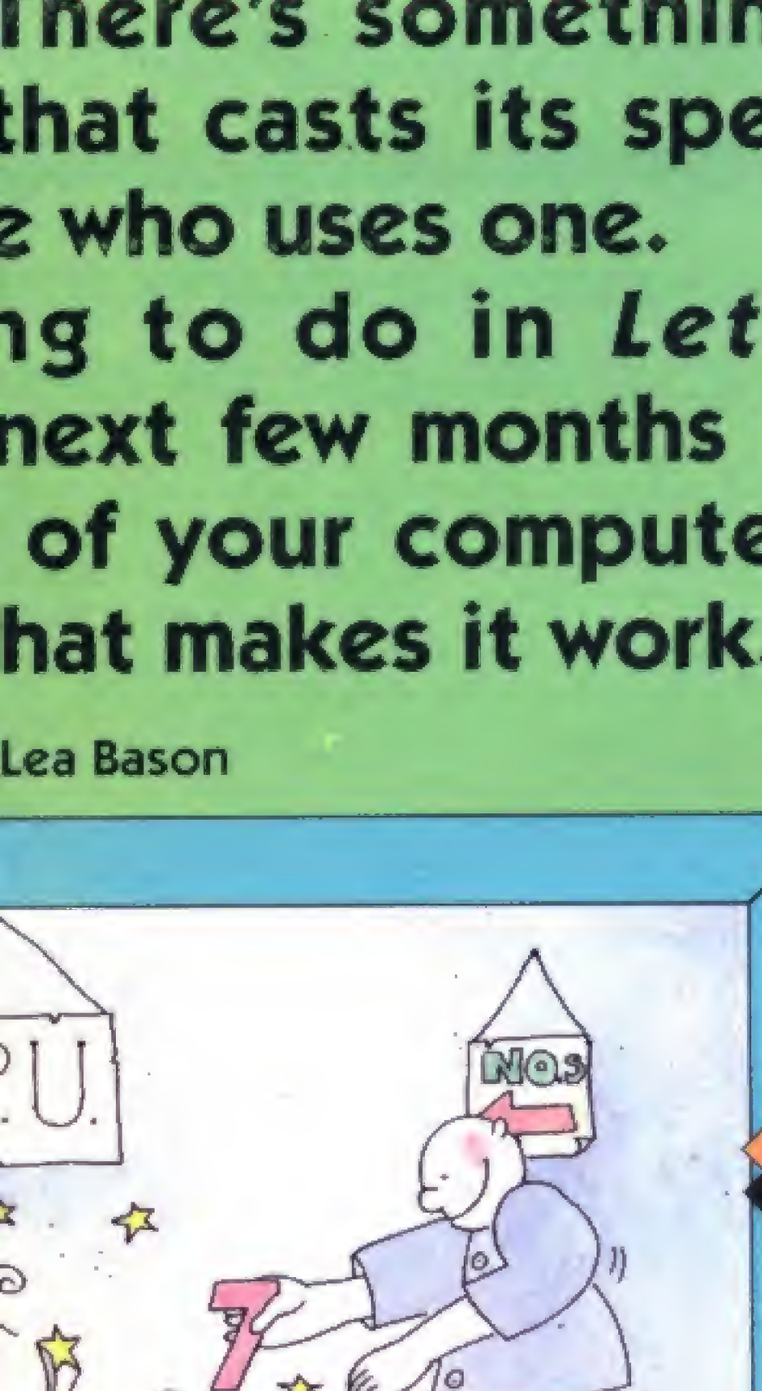
Pictures by

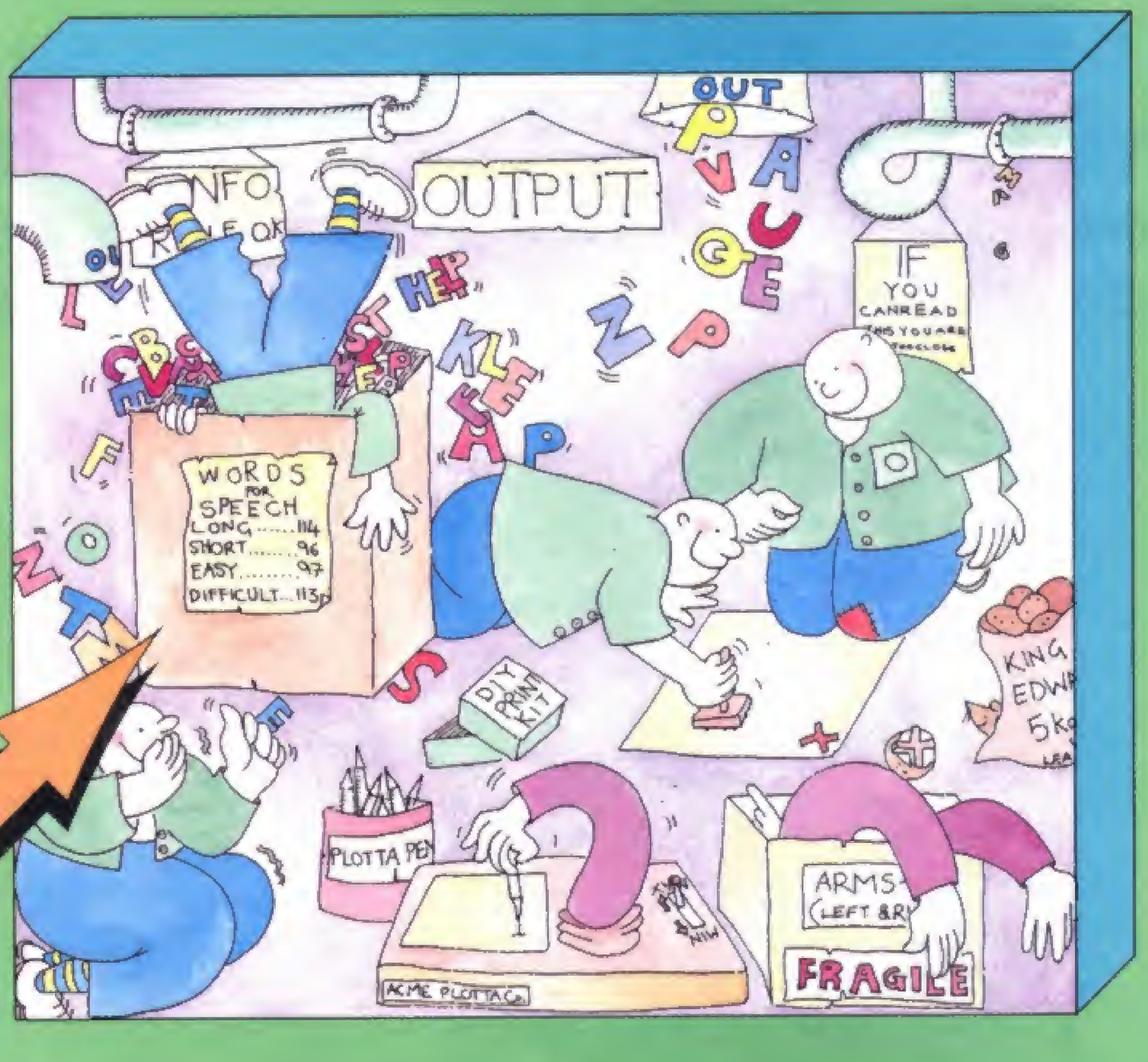
Micros don't work by magic – yet lots of people treat them as if they do. Even some folk who've been using micros for years act as if there were some little genie inside the whole box of tricks running their computer for them. Tell them that that it's actually quite easy to understand micros – far easier than puzzling out exactly how (or why) a mountain bike has all those

outer works

There's something that casts its spell e who uses one. ng to do in *Let's* next few months is of your computer. hat makes it work.

Lea Bason



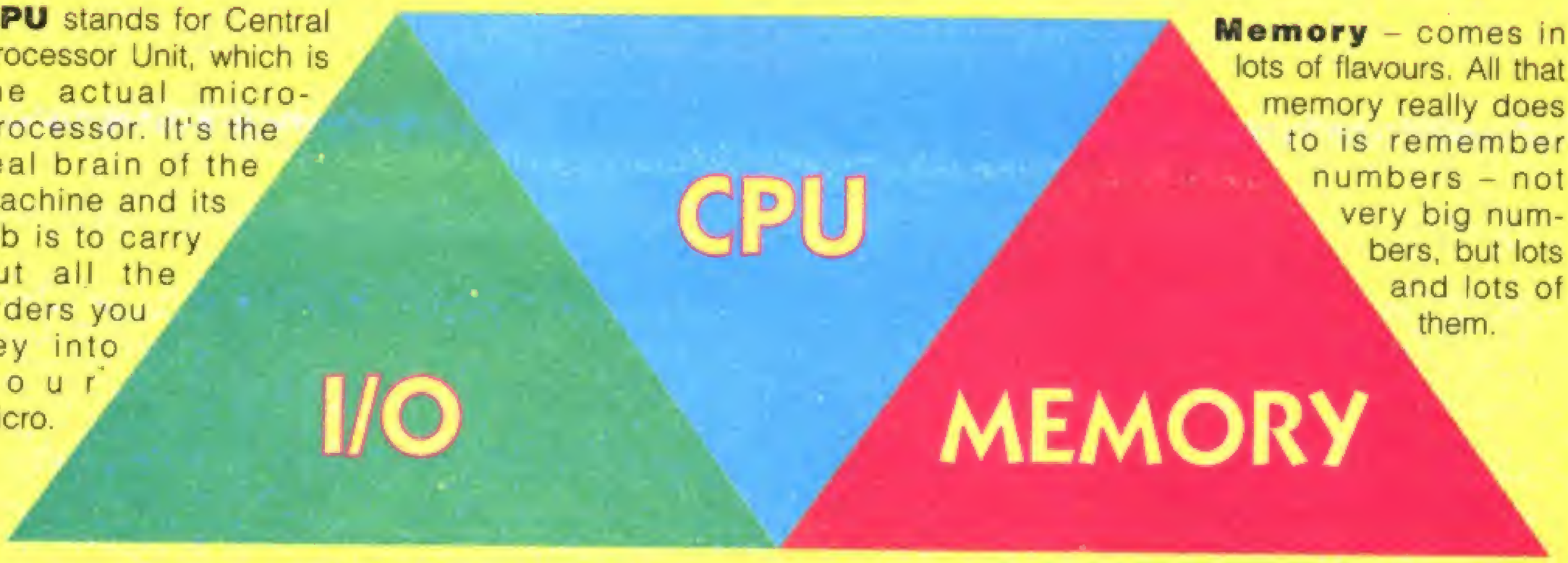


gears, for instance – and they'll never believe you. So here's the good news. It's dead easy to understand how micros work. Here's the even better news: It's all done by numbers. STOP! Before all you maths haters turn over to Logo Lowdown or something else read the best news: The numbers are dead simple. As you'll soon find out.

Now turn the page

A MICRO CONSISTS OF THREE BASIC PARTS

CPU stands for Central Processor Unit, which is the actual micro-processor. It's the real brain of the machine and its job is to carry out all the orders you key into your micro.



Memory – comes in lots of flavours. All that memory really does to is remember numbers – not very big numbers, but lots and lots of them.

I/O means Input/Output. It covers all the things you use to get information or data into and out of your computer. You can **INPUT** with a keyboard, a mouse or a joystick. For **OUTPUT** you use a monitor screen (also known as a VDU) or a printer. One form of I/O you are bound to have is storage. Like the memory, it is used among other things for storing your programs. But, unlike memory, your work will not disappear when you switch the power off. On the early micros – and still for many of us – the only way we could store data was on tape cassettes.

Nowadays, of course, there are discs, both floppy and hard, as well as CD roms and heaven knows what next.

And what do they store? By now you won't be surprised to learn they're numbers.

IT ALL WORKS BY NUMBERS

All the CPU really does is to shoot numbers from one place to another in memory – that is, from one bit of memory to another bit – in double quick time. All it is is a glorified Postal Sorting Office for numbers.

Suppose you press the letter A on the keyboard and a letter A appears on your screen. You've just used the CPU to transfer a number between the keyboard I/O chips and the memory devoted to the screen. What happens is that the I/O chips connected to the keyboard sense that you've pressed the A key.

You won't be surprised to know that there's a number reserved for the A key – we'll give it the code 65. The I/O chips move this code into a special bit of memory set aside for the keyboard called the keyboard buffer.

So now you've got a bit of special keyboard memory with the number 65 stored in it. How does that get an A onto the screen?

Well, one of the CPU's jobs is to look at that special keyboard buffer memory hundreds of times a second. Then in a flash it transfers that code to another piece of memory somewhere else in the micro.

In our example it chooses a piece of memory dedicated to the screen and puts the 65 there. Here again, some I/O chips come into play. They know that 65 is the code for the letter A, so they display on the screen the letter A.

So, it looked like all you did was to press the A key and an A magically appeared on the screen. Not so. The route was:

keyboard I/O
↓
Buffer memory
↓
CPU
↓
screen memory
↓
monitor I/O

What was moving around all the time wasn't the letter A, though. It was the code for A. In fact, as we'll learn later in the series, it was an electrical signal standing in for A that was doing all the travelling. At one heck of a speed...

Of course the input didn't have to come from the keyboard – it could have come from a disc, joystick or other device. And the output didn't have to go to the screen – it could have gone to something else such as a printer or sound synthesiser.

But that's for later. At the moment, just stick to the idea that, despite its magical appearance, all a micro really does is to use its CPU to shift numbers from one part of memory to another, and between that memory and the outside world via the I/O chips.

You'll discover, of course, there's more to it than that, but not as much as you might imagine. Over the next few months we'll see how the CPU works out which bit of memory is which – and what numbers it should be putting there.

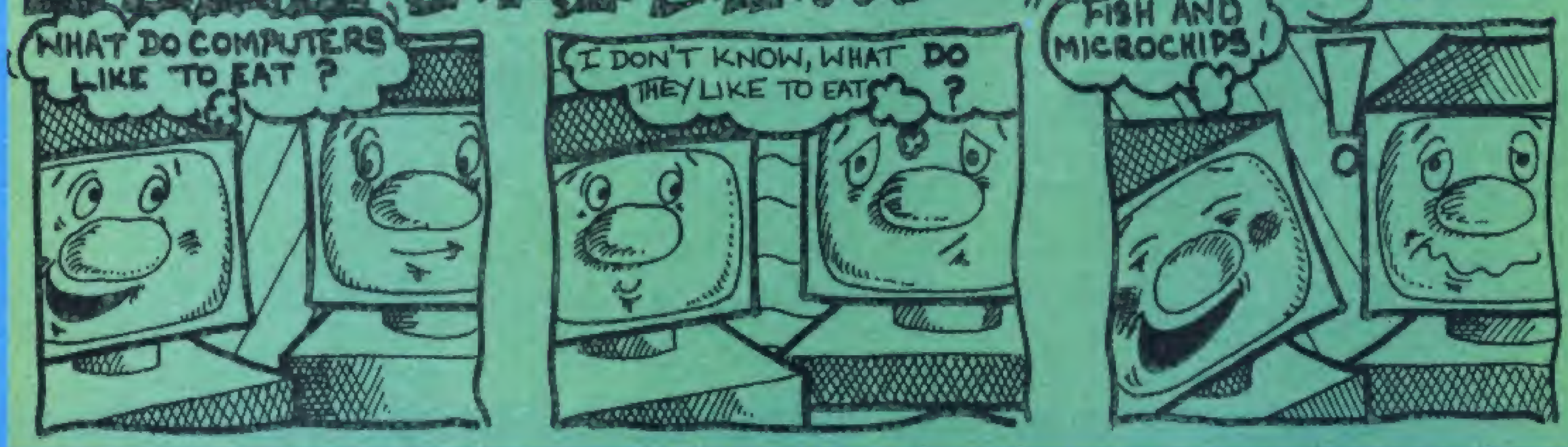
You'll find it's all done by buses!

KEYBOARD KAPERS

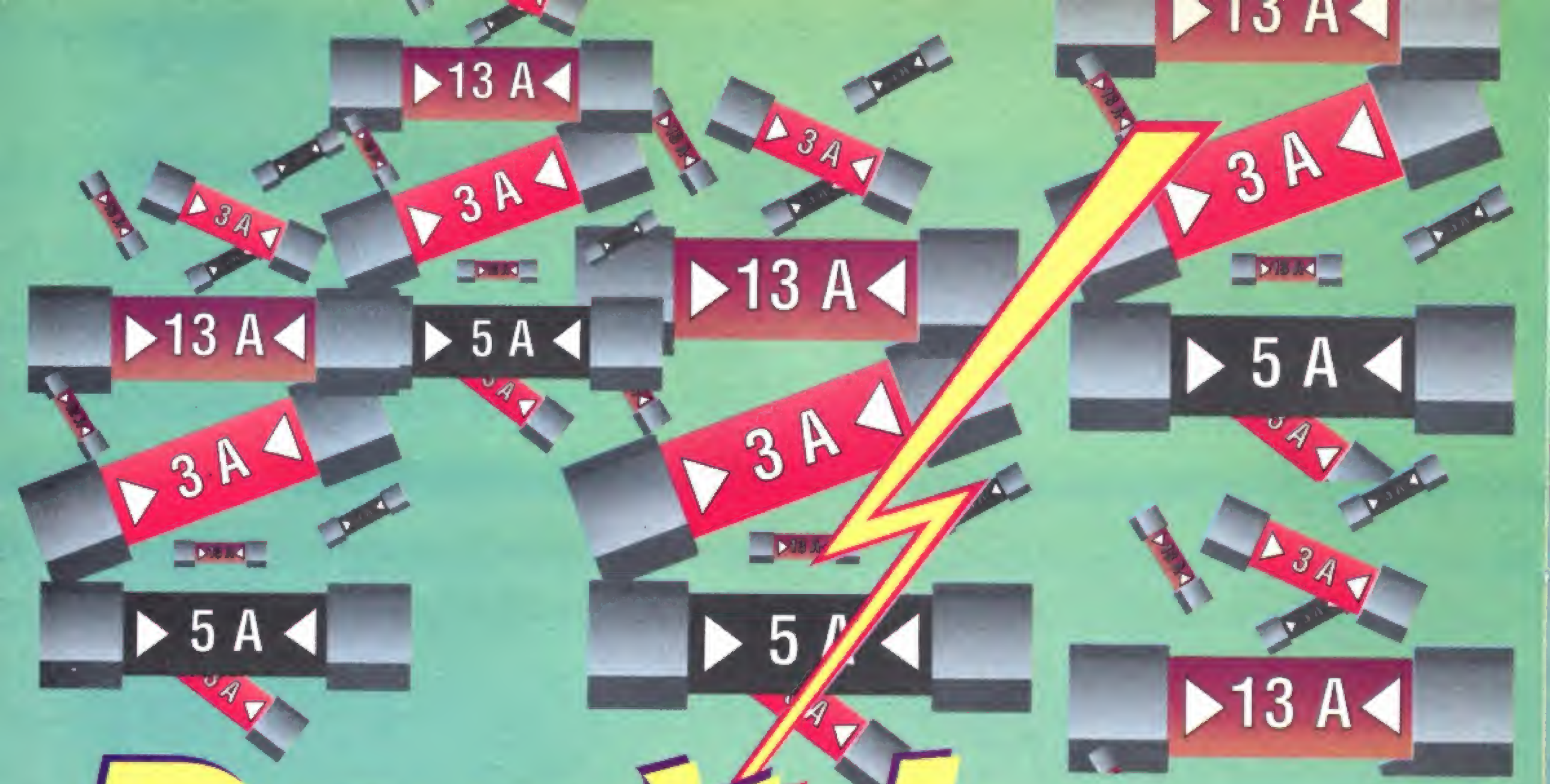
☆STAR CAT☆

I SAY, I SAY, I SAY...

by WEND.



The Micko Kid



Don't be ConFUSED!

Sort out your electrical connections with this SPARKling program dreamed up by The Safe Scientist

For the Electron, Archimedes, and BBC only

When you buy a mains plug it is usually fitted with a 13 amp fuse. And if you just leave it there and wire the plug to whatever bit of equipment you bought it for, all will seem to be OK.

But this happy state of affairs could end if a fault develops in your electric device. The wrong sort of fuse could put you at risk of fire – or even electrocution!

It is vital to fit the right kind of fuse. It's cheap too. It only costs a few pence to be safe.

***Which Fuse?* is a program that's fun to use. And it also helps you learn what sort of fuse is needed for various devices.**

The program displays an electrical appliance and asks you what fuse is needed for it. Work it out following the instructions opposite.

If you get an answer wrong the fuse flashes or the device just disappears. Correct answers are rewarded with a multi-colour flashing display.

You can easily alter the program to include more devices. Advice on how to do this is given on the right.

If you thought that the National Curriculum covered everything you needed to know about science, you'd be completely wrong. Without a bit of extra knowledge you could become a dead scientist rather than a good one. One vital topic is how to wire up an electric plug or which fuse to use in it. Whether you're wiring equipment in the lab or appliances at home you need to connect it safely – as we show here.

```
   10 REM WHICH FUSE?
   20 REM By The Safe Scientist
   30 REM (c) Let's Compute!
   40 MODE1:REPEAT:VDU29,100;0;:GCOL0,3
   50 A%=RND(4):IF A%=1 PROCwasher ELSE
IF A%=2 PROCtelly ELSE IF A%=3 PROClamp
ELSE IF A%=4 PROCclock
   60 PROClabel:PROCplug:PROCwire
   70 PROCpickfuse:PROCcont
   80 UNTIL0
   90 END
  100 DEFPROClabel
  110 VDU29,700;700;
  120 VDU24,0;0;400;200;:GCOL0,130:CLG
  130 GCOL0,1:VDU5:MOVE10,180:PRINT;P%;"
 WATTS":MOVE10,80:PRINT;V%;" VOLTS"
  140 VDU29,100;0;:VDU4:VDU26
  150 ENDPROC
  160 DEFPROCplug
  170 VDU29,800;300;
  180 GCOL0,3
  190 MOVE0,0:DRAW0,300:DRAW250,300:DRAW
250,0:DRAW0,0
  200 MOVE110,280:DRAW140,280:DRAW140,22
0:DRAW110,220:DRAW110,280
  210 MOVE20,80:DRAW50,80:DRAW50,50:DRAW
20,50:DRAW20,80
  220 MOVE200,80:DRAW230,80:DRAW230,50:D
RAW200,50:DRAW200,80
  230 VDU29,100;0;
  240 ENDPROC
  250 DEFPROCwire
  260 MOVE820,300:DRAW820,250:PLOT85,830
,300:PLOT85,830,250
  270 MOVE600,250:PLOT85,820,260:PLOT85,
600,260
  280 MOVE600,520:PLOT85,610,260:PLOT85,
610,520
  290 MOVE400,520:PLOT85,600,510:PLOT85,
400,510
  300 ENDPROC
  310 DEFPROCfuse(c%)
  320 GCOL0,128
  330 GCOL0,3:MOVE900,420:DRAW900,580:DR
AW930,580:DRAW930,420:DRAW900,420
  340 GCOL0,c%
  350 FORN%=424TO576STEP4:PLOT77,910,N%:
NEXT
  360 ENDPROC
  370 DEFPROCblowfuse:VDU29,1015;500;
  380 N%=0:REPEAT:GCOL0,RND(3):MOVE0,0:L
%=RND(200):DRAWSINRADN%*L%,COSRADN%*L%:N
%=N%+RND(50):SOUND0,-15,6,1:UNTILN%>1000
  390 VDU29,100;0;
  400 CLS:PRINT"You have blown"'"the fu
se."'"You need a"'"higher value."
  410 ENDPROC
  420 DEFPROCblowappliance
  430 GCOL0,0
  440 FORN%=450TO0STEP-4:SOUND0,-15,6,1:
MOVEN%,400:DRAWN%,900:NEXT
  450 CLS:PRINT"Your fuse is too"'"high
."'"Your ";A$;" is"'"at risk."
  460 ENDPROC
  470 DEFPROCok
  480 CLS:PRINT"WELL DONE!"'"You have t
he"'"correct fuse for"'"a ";A$
  490 FORN%=1TO30:FORC%=0TO3
  500 VDU19,C%,RND(7);0;
  510 TIME=0:REPEATUNTILTIME>5
  520 NEXT:NEXT:VDU20
  530 FORN%=100TO200STEP10:SOUND1,-15,N%
,2:NEXT:ENDPROC
  540 DEFPROCpickfuse:VDU28,0,31,19,20
  550 COLOUR130:CLS:COLOUR1
  560 IF P%/V%<3 cf%=3 ELSE IF P%/V%<5 c
f%=5 ELSE IF P%/V%<13 cf%=13
  570 PRINT"Pick the fuse for a"'";A$
  580 PRINT'"Possible values are"'"3, 5
 or 13 amps."'
  590 REPEAT:INPUT"Your choice "fuse%:UN
TILfuse%=3 OR fuse%=5 OR fuse%=13
  600 IF fuse%=2 PROCfuse(1) ELSE IF fus
e%=5 PROCfuse(2) ELSE IF fuse%=13 PROCfu
se(3)
  610 PRINT'"Press Space to"'"switch on.
"
  620 REPEATUNTILGET=32
  630 IF fuse%=cf% PROCok ELSE IF fuse%<
cf% PROCblowfuse ELSE IF fuse%>cf% PROCb
lowappliance
  640 ENDPROC
  650 DEFPROCcont
  660 PRINT'"Press Space"
  670 REPEATUNTILINKEY-99:VDU26:COLOUR12
8:CLS:ENDPROC
  680 DEFPROCwasher:A$="Washer"
  690 VDU29,100;0;
  700 VDU5:MOVE100,900:DRAW100,500:DRAW4
00,500:DRAW400,900:DRAW100,900:MOVE140,8
50:PRINT"o o o o"
  710 VDU29,350;670;:MOVE0,80:FORN%=0TO3
60STEP20:DRAWSINRADN%*80,COSRADN%*80:NEX
T:VDU29,100;0;
  720 MOVE100,460:PRINT;A$:VDU29,100;0;
  730 P%=2000:V%=240
  740 ENDPROC
  750 DEFPROCtelly:A$="Television"
  760 MOVE100,800:DRAW100,500:DRAW400,50
0:DRAW400,800:DRAW100,800
  770 MOVE120,780:DRAW120,520:DRAW320,52
0:DRAW320,780:DRAW120,780
  780 VDU5:MOVE350,600:PRINT"o":MOVE350,
680:PRINT"o":MOVE350,760:PRINT"o"
  790 P%=600:V%=240
  800 MOVE100,460:PRINT;A$
  810 ENDPROC
  820 DEFPROClamp:A$="Lamp"
  830 MOVE250,500:DRAW250,550:DRAW400,55
0:DRAW400,500:DRAW250,500
  840 MOVE315,550:DRAW315,700:DRAW325,70
0:DRAW325,550
  850 MOVE250,700:DRAW400,700:DRAW380,90
0:DRAW270,900:DRAW250,700
  860 VDU5:MOVE250,460:PRINT;A$
  870 P%=100:V%=240
  880 ENDPROC
  890 DEFPROCclock:A$="Clock"
  900 MOVE400,500:DRAW400,564:DRAW100,56
4:DRAW100,500:DRAW400,500
  910 VDU5:MOVE150,550:PRINT;RND(12);":"
;RND(59)
  920 MOVE200,450:PRINT;A$
  930 P%=5:V%=240
  940 ENDPROC
```

How to add more devices

The first thing to do is find out what supply (volts) the appliance connects to and what its power is (watts).

The standard voltage in Britain is 240, so that aswers the first question.

Nearly all pieces of electrical equipment carry a label tling you how many watts it is. For example, a typical printer is rated at 240 volts and 120 watts.

To add a new device such as a printer you should start a new procedure at the end of the program.

It needs lines like these:

```
1000 DEFPROCprinter:A$="Printer"
1010 P%=120:V%=240
1020 VDU5:MOVE200,450:PRINT;A$:VDU4
1030 ENDPROC
```

You should set *P*% and *V*% to the correct power (watts) and voltage of the appliance you're adding.

You must also alter Line 50 of the program. The number in the RND(4) instruction needs changing to show how many devices are now included.

You also need to extend this line with one or more instructions like this:

```
ELSE IF A%=5 PROCprinter
```

Finally, if you already know how to draw on the screen, you can also use MOVE and DRAW to create a picture of the device as well. If you do this, the bottom right corner of the drawing should be put at screen position (400,500).

How the program does its sums

To work out how many amps an electrical device takes just divide the watts by the volts. Then use the next highest rated fuse that you can obtain – the usual ones are 3, 5 and 13.

For example, to find out which fuse to use in a 1000 watt electric fire divide 1000 by 240. The result is 4.2, so you can see that a five amp fuse is needed.

The printer mentioned is 240 volts and 120 watts. So you find the amps by dividing 120 by 240. The answer is .5 so you need to use a three amp fuse.

Next month The Safe Scientist will be putting Pressure on you.

AL'S GORITHMS

THIS IS IT! The page where the budding artists among you can pick up a tip or two. And a chance for you to show what YOU can do yourself.

Making a lot with a few lines of code is what it's all about. Alan McLachlan gives you some more bright ideas.

GOING ROUND IN CIRCLES...

Less talk this month, but lots for you to do. The rules are simple: Using circles – and only circles – create something more interesting than just pretty repetitive patterns.

With the programs on this page you can create two unusual pictures of a clown and a worm. They're unusual because they are both built up out of circles filled with colour.

You'll find them very easy to change as you wish. You can wipe out parts of the picture by over-painting them.

You only need type in the core of the program once – use the one suitable for your own micro. Then save it on disc or tape and add one of the sets of DATA lines – or try your own.

Let's look at how the picture is drawn. The first DATA line – line 330 – just tells your micro how many lines follow.

Each of the following lines contains four figures needed to draw a circle: Its x and y positions, its radius and the colour you want to make it.

Each of these is read by the computer. The four figures are then used to draw a circle.

If you are going to use this program to draw your own picture it's best to plan it in advance.

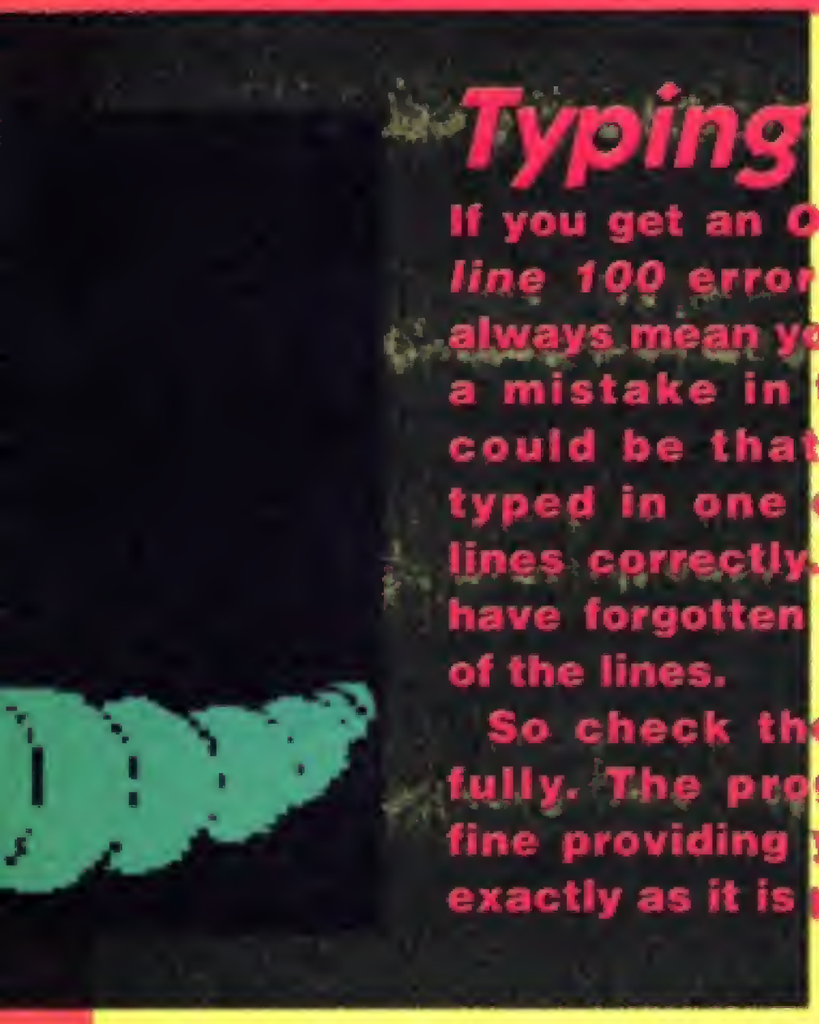
Start by drawing it on paper – working out the position of each circle and the order it is to be drawn. You'll find the result can be quite spectacular and well worth the effort.

And as with last month's routine, if you think you can do something much better using just circles – just send your masterpiece to Let's Compute! and let us all see it.

● *Next month we'll see what we can do with ellipses.*

Electron/BBC Micro/Archimedes core

```
10 REM Circles
20 REM By Alan McLachlan
30 REM (c) Let's Compute!
40 MODE2
50 VDU5
60 VDU23;8202;0;0;0;
70 PROCINIT
80 READcircles
90 FOR P = 1 TO circles
100 READ x%,y%,r%,c%
110 PROCcircle(x%,y%,r%,c%)
120 NEXT
130 PROCcircle(x%,y%,r%,c%)
140 REPEAT UNTIL FALSE
150 DEFPROCcircle(x%,y%,r%,c%)
160 LOCAL I%
170 GCOL0,c%
180 VDU29,x%;y%;
190 MOVE0,0
200 FOR I%=0 TO 30
210 MOVE 0,0
220 PLOT85,r%*c(I%),r%*s(I%)
230 NEXT
240 VDU29,0;0;
250 ENDPROC
260 DEFPROCINIT
270 DIM s(30),c(30)
280 FOR loop%=0 TO 30
290 s(loop%)=SIN(loop%*2.2*PI/30
)
300 c(loop%)=COS(loop%*2.2*PI/30
)
310 NEXT loop%
320 ENDPROC
```



Typing tip

If you get an *Out of Data in line 100* error it does not always mean you have made a mistake in that line. It could be that you've not typed in one of the DATA lines correctly. Or you may have forgotten to enter one of the lines.

So check them all carefully. The program works fine providing you key it in exactly as it is printed.

Data for worm

```
330 DATA 38
340 DATA 200,600,200,2
350 DATA 170,570,220,0
360 DATA 600,600,200,2
370 DATA 630,570,220,0
380 DATA 160,800,20,2
390 DATA 680,800,20,2
400 DATA 1200,300,20,2
410 DATA 1180,280,34,0
420 DATA 1180,280,30,2
430 DATA 1150,260,50,0
440 DATA 1150,260,46,2
450 DATA 1090,240,62,0
460 DATA 1090,240,60,2
470 DATA 1000,230,80,0
480 DATA 1000,230,76,2
490 DATA 910,226,94,0
500 DATA 910,226,90,2
510 DATA 800,230,114,0
520 DATA 800,230,110,2
530 DATA 710,254,134,0
540 DATA 710,254,130,2
550 DATA 620,280,154,0
560 DATA 620,280,150,2
570 DATA 550,350,184,0
580 DATA 550,350,180,2
590 DATA 450,500,224,0
600 DATA 450,500,220,2
610 DATA 550,500,30,0
620 DATA 550,490,30,2
630 DATA 440,450,130,0
640 DATA 430,490,110,2
650 DATA 300,600,70,7
660 DATA 450,600,70,7
670 DATA 300,500,80,1
680 DATA 335,535,20,7
690 DATA 320,520,25,1
700 DATA 320,620,30,8
710 DATA 470,620,30,8
```

Data for clown

```
330 DATA 54
340 DATA 1000,500,100,5
350 DATA 1000,500,80,0
360 DATA 1000,500,74,5
370 DATA 1000,400,30,5
380 DATA 300,500,100,5
390 DATA 300,500,80,0
400 DATA 300,500,74,5
410 DATA 300,400,30,5
420 DATA 650,550,350,5
430 DATA 650,450,200,7
440 DATA 650,450,160,0
450 DATA 650,450,120,7
460 DATA 650,450,80,5
470 DATA 790,450,50,7
480 DATA 510,450,50,7
490 DATA 550,700,100,0
500 DATA 750,700,100,0
510 DATA 550,650,140,5
520 DATA 750,650,140,5
530 DATA 550,660,100,7
540 DATA 570,660,60,4
550 DATA 570,660,30,0
560 DATA 750,660,100,7
570 DATA 730,660,60,4
580 DATA 730,660,30,0
590 DATA 470,540,120,0
600 DATA 470,540,114,5
610 DATA 830,540,120,0
620 DATA 830,540,114,5
630 DATA 650,520,120,0
640 DATA 650,520,114,1
650 DATA 700,580,20,7
660 DATA 680,570,30,1
670 DATA 650,140,70,3
680 DATA 520,180,90,3
690 DATA 520,100,70,3
700 DATA 780,180,90,3
710 DATA 780,100,70,3
720 DATA 620,160,14,1
730 DATA 680,120,14,1
740 DATA 720,200,14,1
750 DATA 780,220,14,1
760 DATA 840,180,14,1
770 DATA 810,120,14,1
780 DATA 760,160,14,1
790 DATA 760,100,14,1
800 DATA 780,60,14,1
810 DATA 580,200,14,1
820 DATA 520,220,14,1
830 DATA 460,180,14,1
840 DATA 490,120,14,1
850 DATA 550,160,14,1
860 DATA 550,100,14,1
870 DATA 520,60,14,1
```

CPC core

```
  10 REM CPC Circles
  40 MODE 0
  50 INK 0,0:INK 1,6:INK 2,18:I
NK 3,24:INK 4,2:INK 5,16:INK 6,2
0:INK 7,26
  60 GOSUB 260
  80 READ circles
  90 FOR p=1 TO circles
 100 READ x%,y%,r%,c%:x%=x%\2:y
%=y%\2:r%=r%\2
 110 GOSUB 150
 120 NEXT
 140 WHILE 1=1:WEND
 150 REM circle
 170 PLOT -5,-5,c%
 180 ORIGIN x%,0.9*y%
 190 FOR i%=0 TO 300 STEP 1+12
0\r%
 200 FOR j%=-2 TO r%\150 STEP 2
 210 MOVE -r%*c(i%),-0.9*r%*s(i
%)+j%
 220 DRAW r%*c(i%),0.9*r%*s(i%)
+j%
 230 NEXT j%
 235 NEXT i%
 240 ORIGIN 0,0
 250 RETURN
 260 REM INITIALISE
 270 DIM s(310),c(310)
 280 FOR loop%=0 TO 310
 290 s(loop%)=SIN(loop%*PI/300)
 300 c(loop%)=COS(loop%*PI/300)
 310 NEXT loop%
 320 RETURN
```

ST/Amiga core

```
  10 REM ST/Amiga Circles
  20 REM written in STOS/AMOS
  40 KEY OFF:MODE 0
  50 REM in AMOS use CLS instea
d of MODE 0
  80 READ num
  90 FOR p=1 TO num
 100 READ x,y,r,c
 110 INK c:CIRCLE x/4,INT(200-(
y/5.15)),r/4
 120 NEXT
 130 WAIT KEY
```

Spectrum core

```
  10 REM Spectrum Circles
  70 GO SUB 260
  75 RESTORE
  80 READ Circles
  90 FOR p=1 TO Circles
 100 READ x,y,r,c:LET x=x/6:LET
y=y/6:LET r=r/6
 110 GO SUB 150
 120 NEXT p
 140 GO TO 140
 150 REM CIRCLE
 170 INK c
 180 LET r=r-2:CIRCLE x,y,r+1
 190 FOR i=1 TO 601 STEP INT (1
+40/r)
 210 PLOT x-r*c(i),y-r*s(i)
 220 DRAW 2*r*c(i),2*r*s(i)
 230 NEXT i
 240 LET r=r+2:CIRCLE x,y,r:IN
VERSE 1:CIRCLE x,y,r:INVERSE 0
 250 RETURN
 260 REM INITIALISE
 270 DIM s(610):DIM c(610)
 280 FOR l=1 TO 610
 290 LET s(l)=SIN (l*PI/600)
 300 LET c(l)=COS (l*PI/600)
 310 NEXT l
 320 RETURN
```

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Europa House
Adlington Park
Macclesfield
SK10 5NY

BE A TOP TURTLE TEE-SHIRT DESIGNER

– and WIN a unique ribbon that will print on fabric!

How would you like to be able to take a printout from your computer and then simply iron it on to a Tee-shirt for the whole world to admire?

You can do this using special printer ribbons from Morley Electronics that cost £10 each. You can get them for most makes of printer – but only the Star LC10 prints in colour.

The top four entries in this contest will each receive one of these special ribbons. Plus a set of five colour pens with which you can draw your design directly on to a Tee-shirt instead.

And a set of pens will also go to 21 runners-up – making 25 winners in all!

Here's all you have to do

Alongside is a Logo program written by Learna Turtle. It does what he wants – but we are sure you can do it better.

Try it out – but remember you first need to load a Logo language program like our own Turtle Logo (see left).

You'll discover Learna's routine draws a very plain Tee-shirt. Now try writing a program to draw something more stylish. Give it more shape and a decent neckline.

When you've completed your program, send a listing – write it out if you haven't got a printer – plus a printout (or a drawing of how your entry appears on your screen if you have no printer).

Attach the coupon below and post before September 28 to:
Tee-shirt Contest, Let's Compute! Europa House, Adlington Park, Macclesfield SK10 4NP.

Learna Turtle's program:

```
FD 300
LT 90
FD 100
RT 90
FD 100
RT 90
FD 400
RT 90
FD 100
RT 90
FD 100
LT 90
FD 300
RT 90
FD 200
RT 90
```

TEE-SHIRT CONTEST

Name_____

Address _____

_____

_____Post Code _____

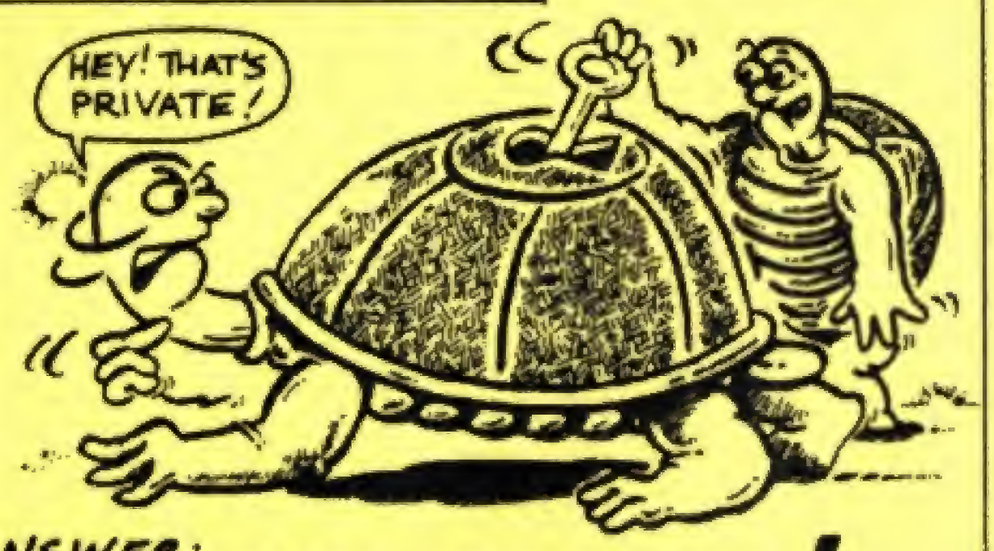
Type of Printer _____

Watch out for all the winners' names in Let's Compute!

LOGO LOWDOWN

BY MICHAEL NOELS

QUESTION: HOW DO YOU UNLOCK A TURTLE ?



ANSWER: WITH A SHELLETON KEY ! HO!HO!

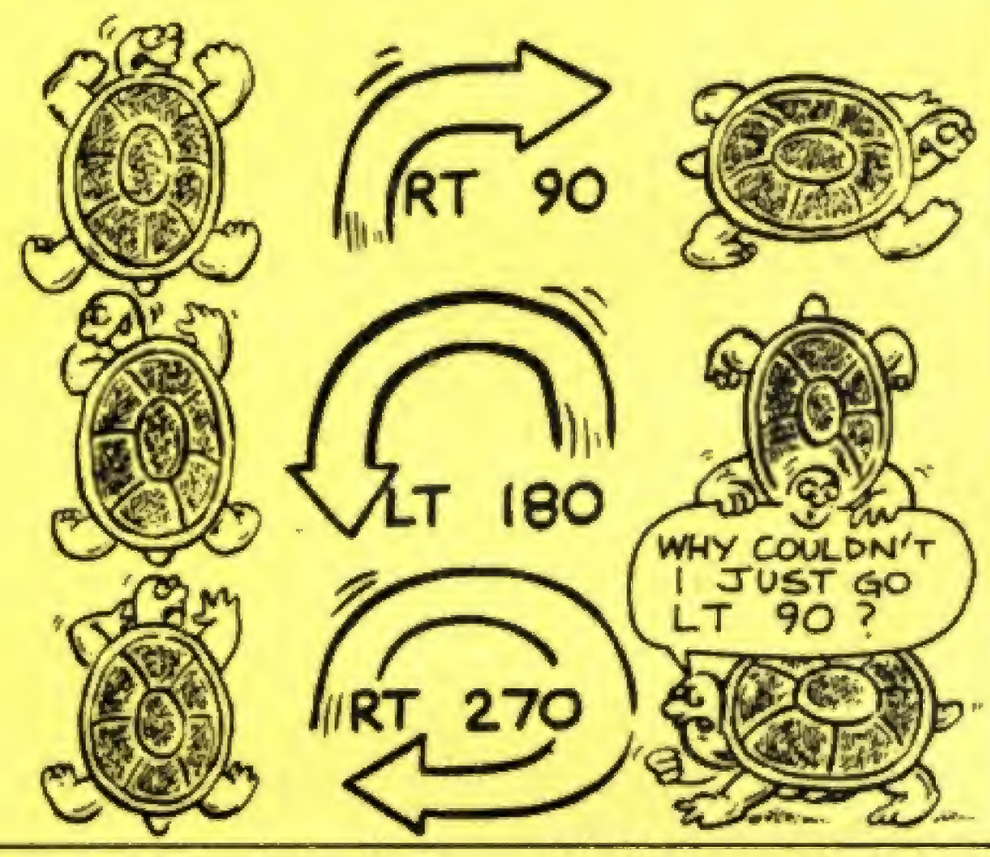
THE STORY SO FAR ... AFTER TEACH TURTLE INTRODUCED THE TINY TURTLES TO

FORWARD

AND

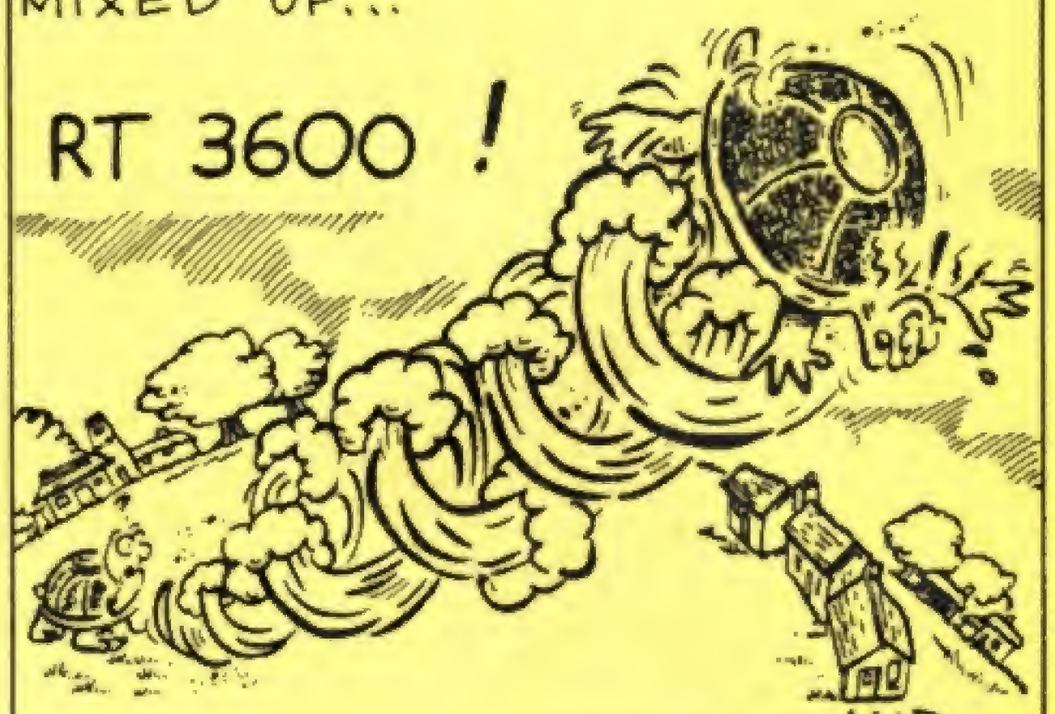
BACKWARD

THEY LEARNED HOW TO TURN



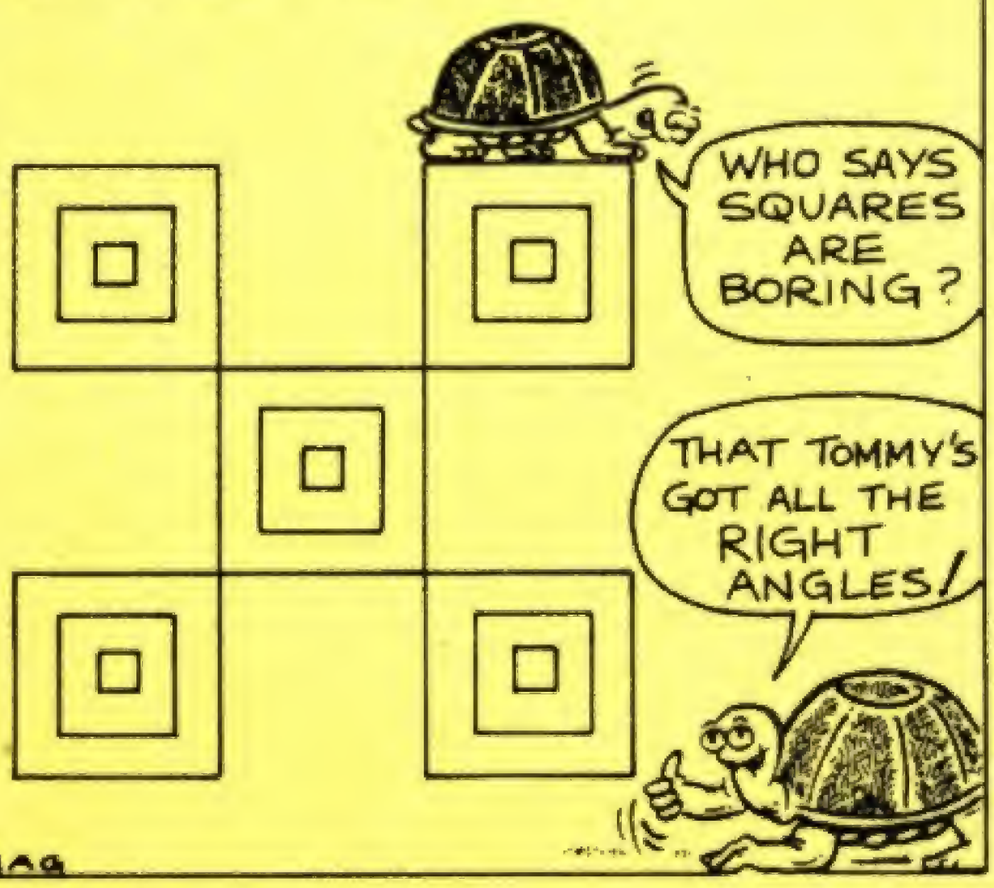
TOMMY TURTLE ALWAYS GOT HIS HUNDREDS AND THOUSANDS MIXED UP...

RT 3600 !

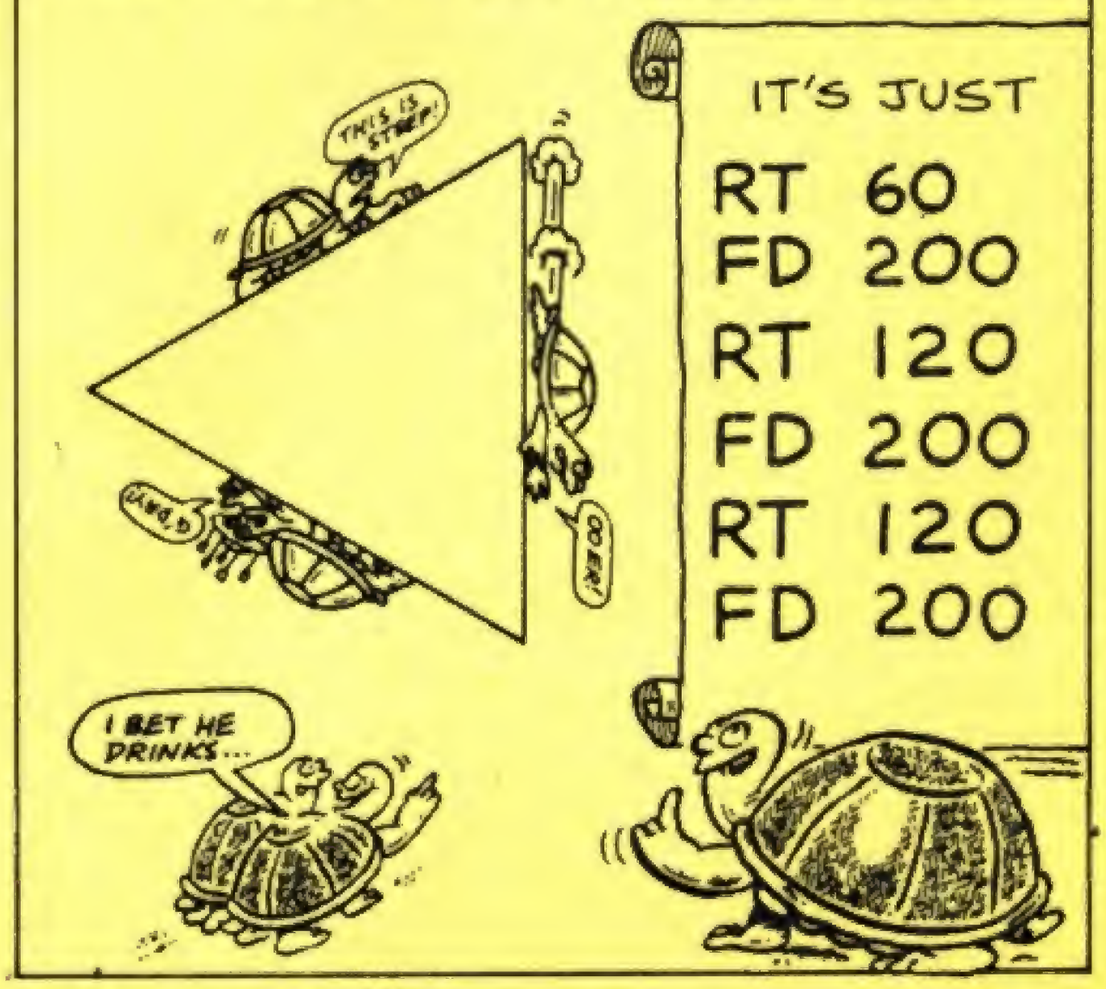


... AND INVENTED THE *HELITURTLE!*

NO SOONER HAD THEY MASTERED QUARTER, HALF, THREE-QUARTER AND FULL TURNS ...



THAN TERRY *TRIANGULATED!*



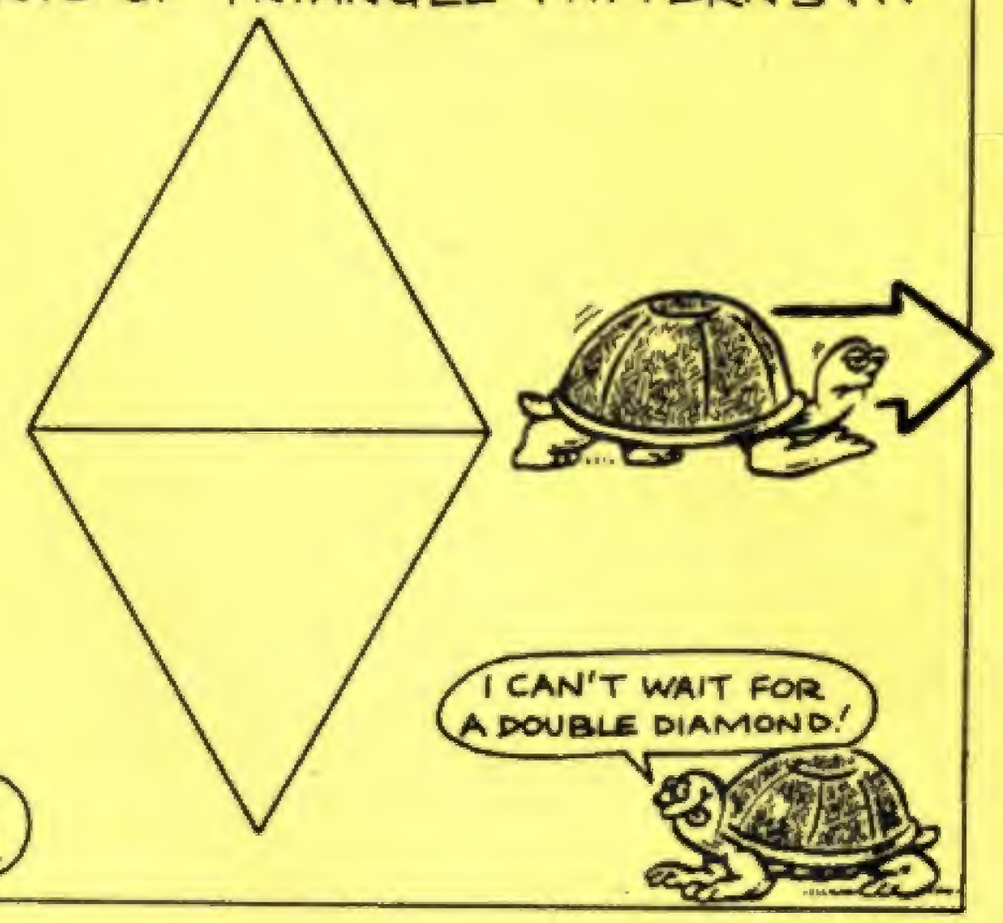
HE'D DISCOVERED:

$\frac{1}{3}$ TURN = 120

$\frac{1}{6}$ TURN = 60

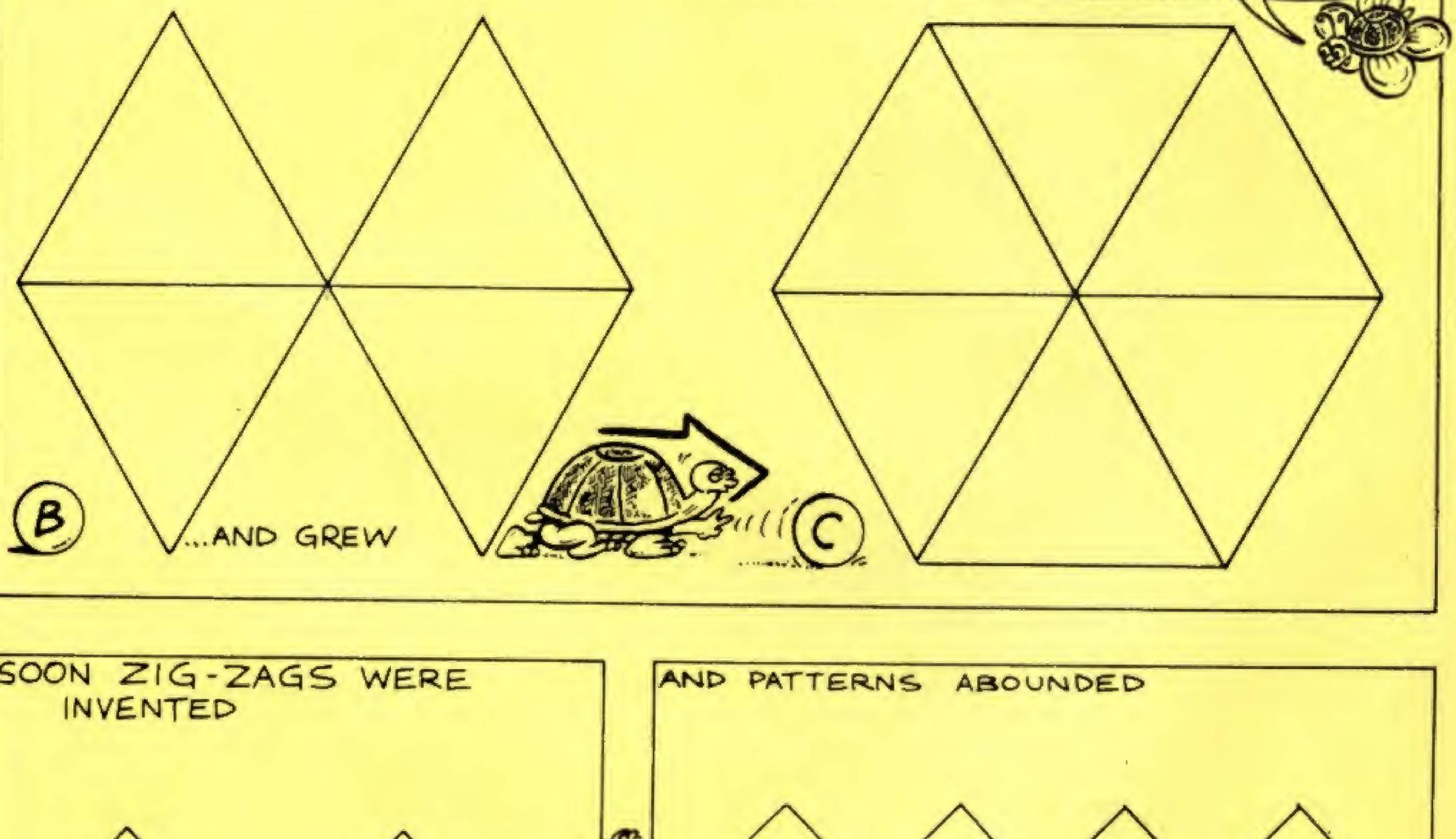
$\frac{1}{12}$ TURN = 30

...AND TURNED THEM INTO ALL SORTS OF TRIANGLE PATTERNS...

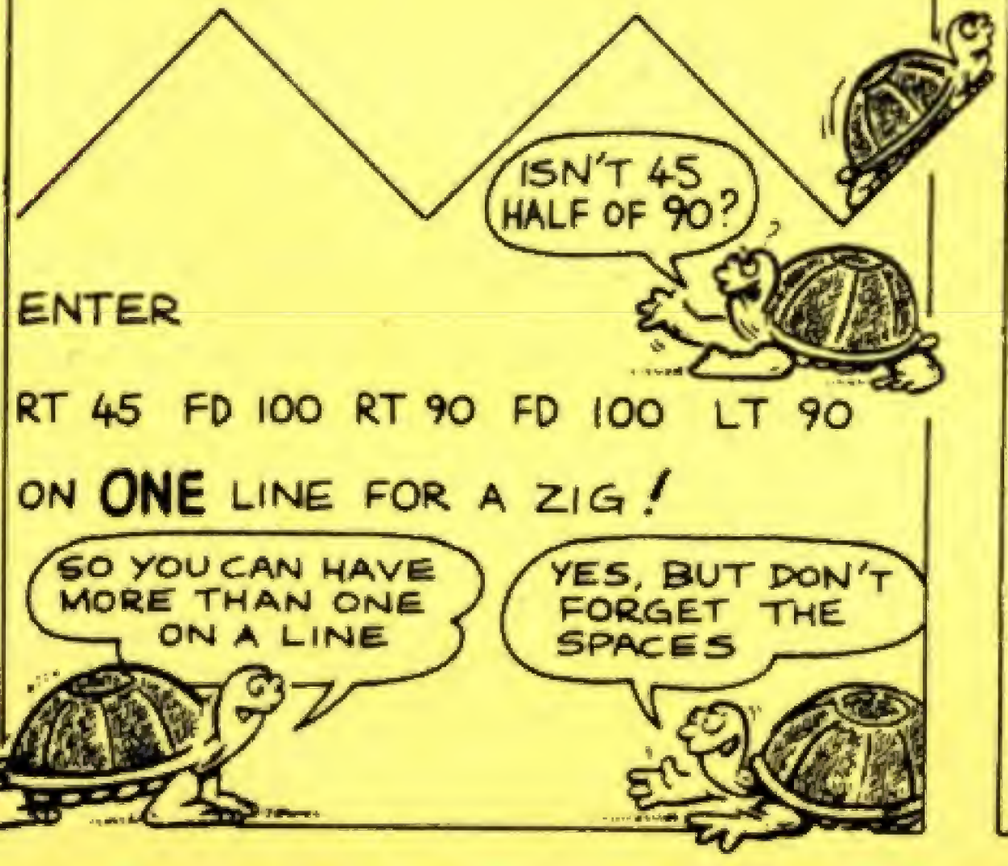


WHICH GREW...

... INTO A HEXAGON



SOON ZIG-ZAGS WERE INVENTED

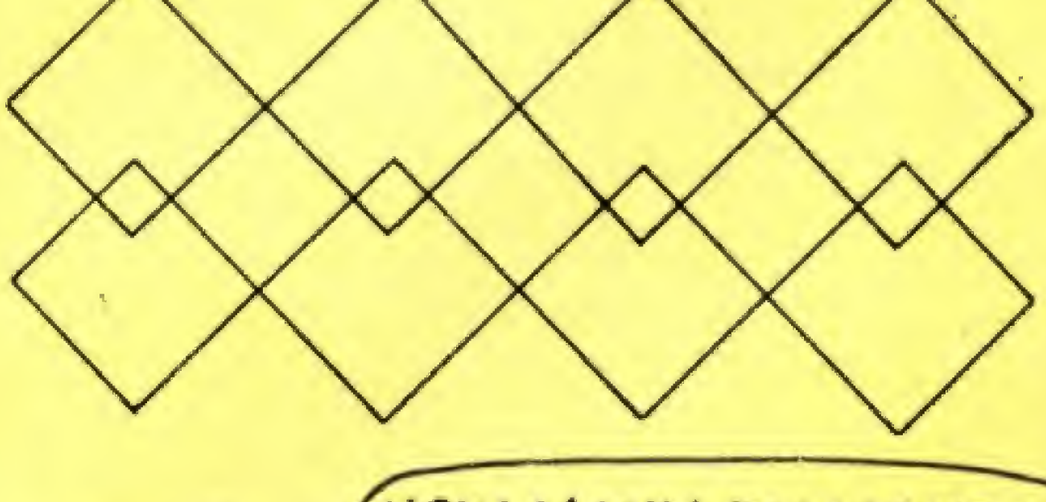


ENTER

RT 45 FD 100 RT 90 FD 100 LT 90

ON **ONE** LINE FOR A ZIG!

AND PATTERNS ABOUNDED



THEN THE TURTLE TWINS NOTICED SOMETHING:

OR IS IT ?

AND SO **REPEAT** WAS DISCOVERED

REPEAT 2 [ ]

GIVES YOU TURTLE TWINS:

REPEAT 3 [ ]

GIVES YOU TURTLE TRIPLETS

SO HOW DID TERESA CREATE THIS TRIANGLE ? WAS IT

REPEAT 3 [RT 60 FD 200 RT 120]

OR

RT 60 REPEAT 3 [FD 200 RT 120]

WOULD REPEAT 3 [RT 120 FD 200] WORK? WHAT'S THE DIFFERENCE?

NOTICE HOW **REPEAT** WORKS

REPEAT 3 [RT 120 FD 200]

THE FIRST WORD

THE NUMBER OF TIMES TO REPEAT

WHAT IS REPEATED [INSIDE SQUARE BRACKETS]

CAN YOU GUESS WHAT THESE COMMANDS DRAW — BEFORE YOU TRY THEM ?

REPEAT 4 [FD 200 RT 90]

REPEAT 12 [FD 200 BK 200 RT 30]

REPEAT 6 [FD 200 RT 60]

REPEAT 12 [FD 100 RT 30]

REPEAT 36 [FD 20 RT 10]

CAN YOU MATCH THE SHAPES TO THEIR COMMANDS?

FINALLY, CAN YOU TELL WHAT THIS DOES ?

REPEAT 6 [RT 60 REPEAT 3 [FD 200 RT 120]]

TERESA WOULD RECOGNISE THE BIT THAT'S UNDERLINED

NEXT MONTH WE TEACH OUR TURTLES SOME SHORT CUTS!

ADMISSION: ADULTS £4.00 – UNDER 16's £3.00

WESTMINSTER EXHIBITION CENTRE
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London, SW1

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Saturday 8th Sept – 10.00 a.m. to 6.00 p.m.
Sunday 9th Sept – 10.00 a.m. to 6.00 p.m.

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- Meet the staff of BBC ACORN User Magazine who will be on hand to give you technical advice.
- **Special feature stand by ACORN COMPUTERS.**
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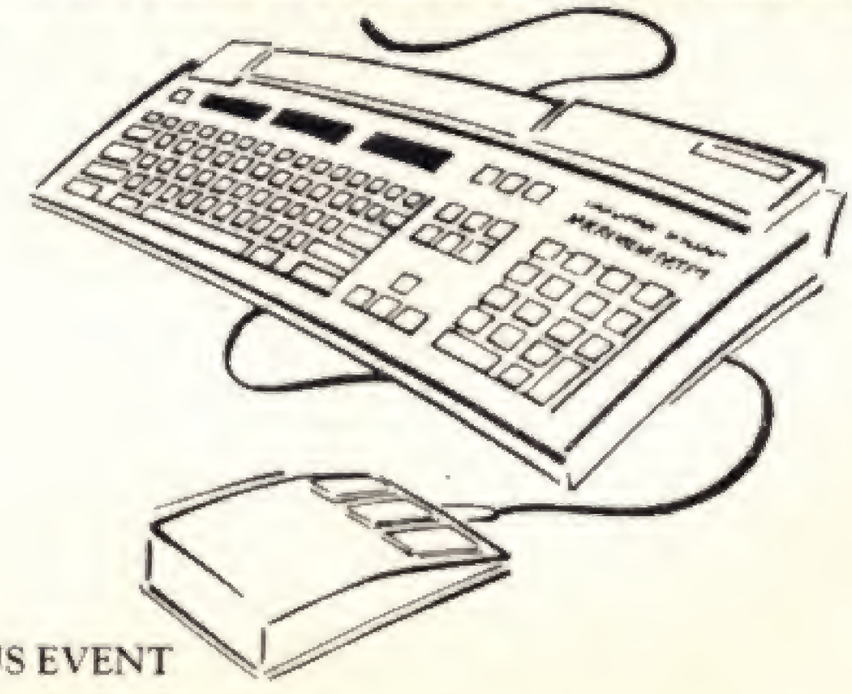
- **FREE courtesy coach from Victoria Station. Take the Wilton Road exit and look out for the Guide.**



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In association with
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For more information phone Safesell Exhibitions on 0737 814084

Dear Mr Newsagent

Please deliver *Let's Compute!* to the address below until further notice.

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Address _____

_____

Note to newsagent: If you have difficulty in obtaining Let's Compute! please contact the distriubutors to the news trade, COMAG, on 0895 444 055.

GAMES MAGIC!

For the Electron, Archimedes, and BBC only

Last month our ace artist Mike Goldberg showed you how to write your own magic game. Now he lets you into more big secrets. Use a touch of Mike's Magic to add lots more unique bits and pieces to your creation

If you've typed in last month's listing and got a monster roaming round a screen under your control you're well on the way to creating your own action-packed game.

Let's add some more monsters, objects for you to collect and those vital ingredients for any game – score and hyperspace. The listing opposite gives you the extra lines you need.

First you need to LOAD last month's listing – or type it in if you haven't done so already.

It's always a good idea to have DATA lines at the end of the program. So, as you're going to add some procedures to the program you need to give the data higher line numbers.

Copy all the lines from Line 800 to the end of your program – where they can be easily found. Make the first one Line 8000, and carry on upwards in steps of 10. The original lines can then be deleted by entering DELETE 800,1000.

Now you're ready to add, alter and remove lines to add features to your game.

Just type in the new listing on the page and your program will be modified automatically.

The lines printed in red indicate new lines added. Blue indicates lines altered. And if you just type the line numbers shown in green the appropriate lines will be removed.

The orange areas show you the new procedures. The REM lines explain what they do. When you've made these changes SAVE the game before you RUN it.

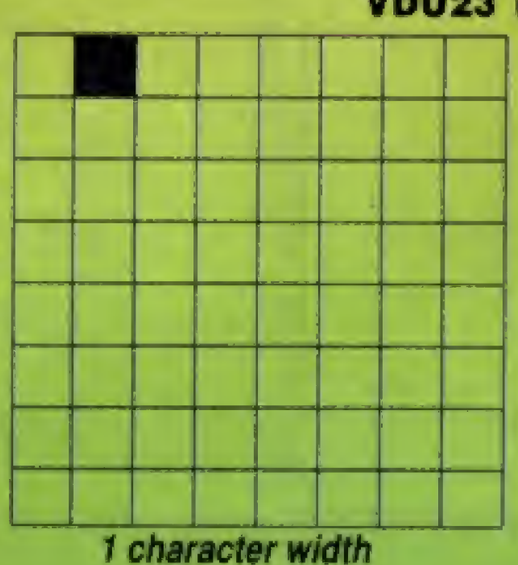
Your game will now have lots of features and you've taken the next step towards a super mega game.

The Baddies and objects are made up from characters defined by VDU23 instructions in Lines 251 to 254.

If you already know how to define shapes yourself you can change them now.

But a word of warning: You MUST include the pixel shown on the left in any Baddies you design yourself.

Why? Because this pixel is used as a collision detector. It enables the program to show where the Baddy is at any time.



1 character width

```
  55 W%=4:n%=8
  71 DIMU%(W%),V%(W%)
  72 DIMD%(3),E%(3)
  73 DIMox%(n%),oy%(n%)
  75 REPEAT
  85 REPEAT
 120 PROCdelay(5)
 132 PROCbad
 140 UNTILend%=10Rc%=n%
 141 IFc%=n%PROCnext
 142 COLOUR2:COLOUR128:PRINTTAB(4,30)"P
RESS  SPACE"
 145 *FX15
 146 REPEATUNTILGET=32
 147 UNTILend%=1
 149 UNTIL0
 171 D%(0)=0:D%(1)=1:D%(2)=0:D%(3)=-1
 172 E%(0)=-2:E%(1)=0:E%(2)=2:E%(3)=0
 175 COLOUR1:PRINTTAB(0,1)"LIVES  SCORE
:  LEVEL"
 178 end%=0
 251 VDU23,225,231,165,231,36,60,60,102
,195
 252 VDU23,226,153,189,255,255,255,127,
60,219
 253 VDU23,227,126,66,82,82,74,66,60,24
 254 VDU23,228,24,24,24,24,24,24,60,126
 341 H$=K$+CHR$3+CHR$225+D$+CHR$226
 342 C$=K$+CHR$1+CHR$227+D$+CHR$228
 345 W%=4:S%=0
 346 L%=3:l%=1:r%=8000
 347 n%=8
 348 COLOUR128:COLOUR2:PRINTTAB(7,2)"00
0000"
 372 RESTOREr%
 375
 376 VDU28,0,31,19,4:CLS:VDU26
 420 READX$:IFX$="STOP"r%=8000:RESTOREr
%:READX$
 531 COLOUR128
 532 FORI%=0TOn%-1
 533 GOSUB5000:ox%(I%)=f%:oy%(I%)=g%
 534 PRINTTAB(f%,g%)C$
 536 NEXT
 580 COLOUR128:COLOUR2
 582 PRINTTAB(2,2);L%TAB(17,2);l%
 600 GOSUB5000:X%=f%:Y%=g%
 602 PRINTTAB(X%,Y%)Y$(0)
 605 FORI%=0TOW%-1:GOSUB5000:U%(I%)=f%:
V%(I%)=g%:PRINTTAB(U%(I%),V%(I%))H$:NEXT
 610
 615 z%=0:h%=0:bh%=0
 616 c%=0
 685
 686 IFINKEY-1PROChs:IFS%>0S%=S%-500:PR
INTTAB(7,2)"000000":PROCscore(0)
 725 P%=POINT(p%,q%)
 730 IFP%<>0PROChit:IFh%=0ENDPROC
 775 IFh%>0PROCaction:h%=0
 790 REM  ** BADDIES **
 800 DEFPROCbad
 810 R1=RND(4)-1
 820 p1=(U%(z%)+D1(R1))*64+8
 830 q1=1020-((V%(z%)+E1(R1))*52)
 840 IFPOINT(p1,q1)<>0PROCbaddhit:IFbh%=
0z%=(z%+1)MOD(W%):ENDPROC
 850 PRINTTAB(U%(z%),V%(z%))B$
 860 U%(z%)=U%(z%)+D1(R1):V%(z%)=V%(z%)
+E1(R1)
 870 PRINTTAB(U%(z%),V%(z%))H$
 880 z%=(z%+1)MOD(W%)
 890 IFbh%>0PROCbadaction:bh%=0
1000 ENDPROC
1010 REM  ** HYPERSPACE **
1020 DEFPROChs
1022 SOUND2,-13,200,1
1025 GOSUB5000
1050 PRINTTAB(X%,Y%)CHR$8:XI=X%:YI=g%
1055 FORI%=3TO1:PROCdelay(5):PRINTTAB(X
%,Y%)B$:PROCdelay(5):PRINTTAB(XI,YI)Y$(I
%):NEXT
1060 ENDPROC
1070 REM  ** HIT? **
1080 DEFPROChit
1090 h%=0
1100 FORI%=0TOW%-1
1110 IFX%+x%=ox%(I%)ANDY%+y%=oy%(I%)h%=
2
1140 NEXT
1190 ENDPROC
1200 REM  ** ACTION **
1210 DEFPROCaction
1220 IFh%=1ANDL%>0L%=L%-1:COLOUR128:COL
OUR2:PRINTTAB(2,2);L%:SOUND1,-12,90,1:IF
L%>0PROCns
1222 IFh%=2SOUND3,-13,0,1:PROCscore(500
):c%=c%+1
1230 IFL%=0end%=1
1250 ENDPROC
1260 REM  ** BAD ACTION **
1265 DEFPROCbadaction
1270 IFbh%=1ANDL%>0L%=L%-1:COLOUR128:CO
LOUR2:PRINTTAB(2,2);L%:SOUND1,-12,190,1:
IFL%>0PROCns
1272 IFbh%=2SOUND2,-13,230,1:GOSUB5000:
dx%(wo%)=f%:dy%(wo%)=g%:PRINTTAB(f%,g%)C
$
1285 IFL%=0end%=1
1290 ENDPROC
1305 REM  ** BAD HIT **
1310 DEFPROCbaddhit
1315 bh%=0
1320 IFD%(z%)+D1(R1)<>E%ANDV%(z%)+E1(R1)
=V%bh%=1
1322 FORI1=0TOn%-1
1324 IFU%(z%)+D1(R1)=ox%(I1)ANDV%(z%)+E
1(R1)=oy%(I1)bh%=2:wo%=I1
1326 NEXT
1390 ENDPROC
1400 REM  ** SCORE **
1410 DEFPROCscore(sc%)
1420 S%=S%+sc%:d%=LEN(STR$(S%))
1430 PRINTTAB(13-d%,2);S%
1440 ENDPROC
1450 REM  ** NEXT SCREEN **
1455 DEFPROCnext
1460 r%=r%+10
1462 L%=L%+1
1490 ENDPROC
1500 REM  ** DELAY **
1510 DEFPROCdelay(add%)
1520 delay%=TIME+add%:REPEATUNTILTIME>d
elay%
1530 ENDPROC
1000 REPEATf%=RND(18):g%=(RND(11)+2)*2:
g%=f%*64+8:g%=1820-(g%*52):UNTILPOINT(p%
,q%)=0:RETURN
```

WHOOPS!

In last month's Editor listing, there's a – on the end of line 1090. We don't know how it got there but you should leave it out. The correct line is:

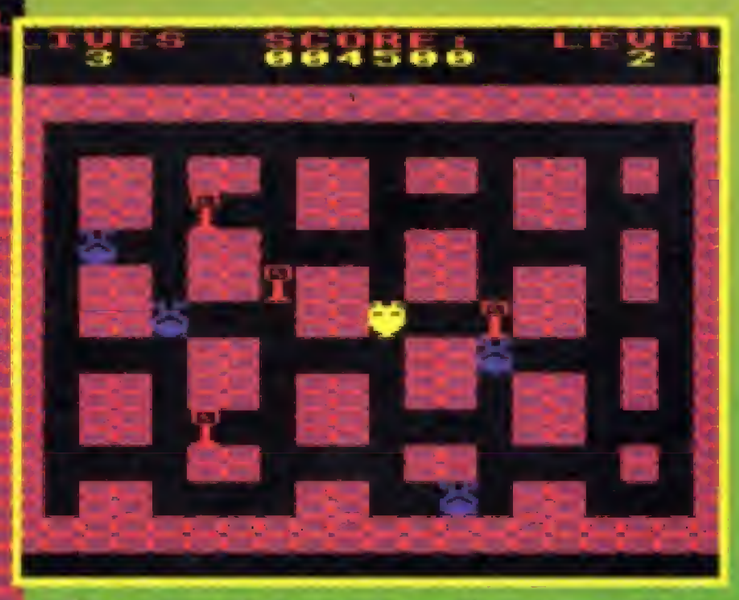
```
1090 DEFPROCwhich1
```

The new features are:

***Baddies*: These get in your way. If you touch one you lose a life and move to another place on the screen. You can have as many or as few baddies as you want by changing the number that *W%* is set to in Lines 55 and 345.**

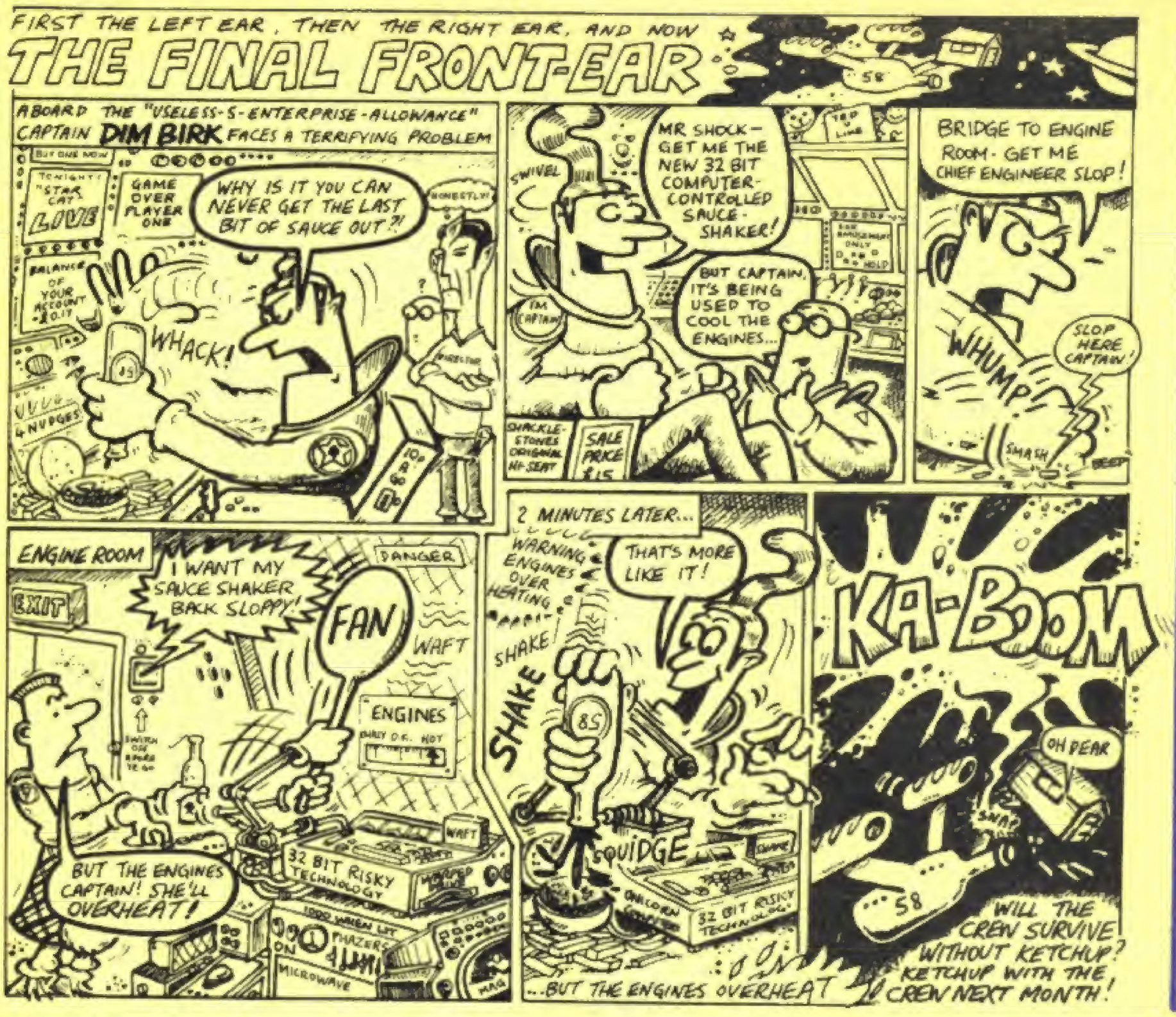
***Objects:* They are scattered around everywhere. The aim is to collect all of them in order to reach the next screen. You can alter how many there are by changing *n%* in Lines 55 and 347. Each object you collect scores 500 points but you can change this to any number you want. Just alter the figure 500 in Line 1222.**

***Hyperspace:* This is a feature of all good games. It lets you get out of the way quickly as baddies approach. To move to another part of the screen press Shift – but you lose 500 points. You can alter these in Line 686.**



The first two levels complete with baddies and objects

The main listing for the game was in last month's *Let's Compute!* It is also on the software that comes FREE when you join the *Let's Compute! Club*. Full details are on Pages 32-33



DART

DART – turtles can do amazing things.
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Dart is a low-cost turtle graphics package for children. Dart gives you:

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- ★ control of a screen "turtle"
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- ★ an environment for problem-solving

Available for BBC B, Master, A3000 and Archimedes.

Price: £15 + VAT.

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FOOTBALL CRAZY

Suffering from lack of football on the TV? Missing the commentators' chat? Pining for the antics of Cameroon and Argentina? Worry not – we have the solution.

Concerned by your plight, Superior Software to give away four World Cup Subbuteo sets and for those of you with a BBC Micro or Electron 20 copies of Superior Soccer.

WIN! Subbuteo

Four copies of the Special World Cup Edition could be yours – complete with two teams, specialist players, fencing, scoreboard and 'field'. It demands skill and tactics. If you practise hard you might even find yourself taking part in the Subbuteo World Cup in 1994!

WIN! Superior Soccer

As well as the fun of playing the game, Superior Soccer lets you decide the club's whole strategy.

Available on the BBC or Electron, there is the arcade section where you choose who you play and for how long.

A bird's eye view of the match and witty comments from the TV presenter add to the fun.

If you fancy your chances as the next England manager, you can have a go yourself in the management section.

You can start anywhere in the football league, fighting for promotion and avoiding relegation. Buy and sell players as you form the team you reckon will take you to the top.

Lose and you can always try again – but with different tactics.

If you have been following the World Cup you might have picked up enough information to win one of these games.

Answer the five questions correctly on the form below, fill in your name and address, and the first 24 correct entries will collect one of these prizes.

All entry forms must arrive at *Let's Compute!* before September 28

ENTRY FORM

CAN YOU SAY:

1. Which England player has retired?
   a) Peter Shilton
   b) Paul Gascoigne
   c) Gary Linekar

2. Who won the 1986 and 1990 World Cups?
   a) Argentina and Germany
   b) Germany both times
   c) Italy and Germany

3. Which award did the England team win in 1990?
   a) The World Cup
   b) The Fair Play Cup
   c) The Runners-up medal

4. Where will the 1994 World Cup be held?
   a) Italy b) Germany c) USA

5. Who is the manager of the Irish team?
   a) Bobby Charlton b) Jack Charlton c) Cliff Charlton

ANSWERS

1 _____

2 _____

3 _____

4 _____

5 _____

Name _____

Address _____

_____

_____

Postcode _____ Age _____

My computer is: _____

Send your completed entry form to: Superior Competition, *Let's Compute!* Europa House, Adlington Park, Macclesfield SK10 4NP.

Watch out for all the winners' names in Let's Compute!

SUMMER MADNESS SALE SUMMER MADNESS SALE

PUBLIC APOLOGY

M. D. Office Supplies would like to take this opportunity of apologising to all its competitors. As one of the U.K.'s Market leaders in superb quality DISCS and storage boxes. We shall be giving our customers even more for less money.
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When will Christmas Day next be on a Sunday?

Will Saturday Night be at the weekend?

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Stephen Wade invites you to be a time traveller – and unlock the secrets of the calender

Want to know which day of the week a certain date falls on? It's a real doddle with this program!

Type in the core, and then the extra lines for your micro – and SAVE it.

When the program is RUN, you are asked to enter the day number, the month number and the year of the date you are interested in. Type these in using numbers. For example, the 25th of December 1990 would be entered as:

Day number : 25
Month : 12
Year : 1990

And that's all there is to it. You'll be told the day of the week on which that date falls.

If you want to quit the program press Return each time the computer asks you a question. If no day, month and year are entered the program automatically ends.

ST/Amiga using STOS/AMOS

```
  40 DIM d$(7)
  80 KEY OFF:CLS
 100 REPEAT
 170 LOCATE 0,0 : CENTRE "DAY O
F THE WEEK"
 240 IF d=0 AND m=0 AND y=0 THE
N CLS : END
 250 IF m<3 THEN m=m+12 : DEC y
 260 a#=d+2*m+INT(0.6*(m+1))+y+
INT(y/4)-INT(y/100)+INT(y/400)+2
 270 a#=INT(((a#/7-INT(a#/7))*7
)+1.5)
 290 PRINT d$(a#)
 310 REPEAT
 320 UNTIL INKEY$<>""
 330 UNTIL 0
```

Spectrum

```
  40 DIM d$(7,9)
 170 PRINT TAB 8;"DAY OF THE WE
EK"
 180 PRINT: PRINT
 240 IF d=0 AND m=0 AND y=0 THE
N CLS:STOP
 250 IF m<3 THEN LET m=m+12: LE
T y=y-1
 260 LET a=d+2*m+INT (0.6(*m+1)
)+y+INT (y/4)-INT (y/100)+INT (y
/400)+2
 270 LET a=INT ((a/7-INT (a/7))
*7+1.5)
 290 PRINT d$(a)
 310 IF INKEY$<>"" THEN GO TO 3
10
 320 IF INKEY$="" THEN GO TO 32
0
 330 GO TO 150
```

THE CORE (ALL micro's)

```
  10 REM Day of the week
  20 REM by Stephen Wade
  30 REM (c) Let's Compute!
  50 FOR n=1 TO 7
  60 READ d$(n)
  70 NEXT n
 150 CLS
 210 PRINT:INPUT "Day number :
";d
 220 PRINT:INPUT "Month : ";m
 230 PRINT:INPUT "Year : ";y
 280 PRINT:PRINT:PRINT "The day
 is ";
 300 PRINT:PRINT "Press a key..
."
 340 DATA "Saturday","Sunday","
Monday"
 350 DATA "Tuesday","Wednesday"
 360 DATA "Thursday","Friday"
```

Commodore 64/128

```
  40 DIM D$(7)
 150 PRINT CHR$(147);
 170 PRINT "DAY OF THE WEEK"
 180 PRINT:PRINT
 240 IF D=0 AND M=0 AND Y=0 THE
N PRINT CHR$(147);:END
 250 IF M<3 THEN M=M+12:Y=Y-1
 260 A=D+2*M+INT(.6*(M+1))+Y+(Y
 DIV 4)-(Y DIV 100)+(Y DIV 400)+
2
 270 A=INT((A/7-(A DIV 7))*7+1.
5)
 290 PRINT D$(A)
 310 GET A$:IF A$="" THEN 310
 320 GOTO 150
```

Amstrad CPC

```
  40 DIM d$(7)
  80 MODE 1
  90 PRINT CHR$(2)
 100 WINDOW 5,36,5,21
 110 INK 0,24
 120 INK 1,2
 130 PAPER 1
 140 PEN 0
 160 WINDOW 6,35,6,20
 170 PRINT TAB(8) "DAY OF THE W
EEK"
 180 WINDOW 6,35,8,20
 190 WHILE 1=1
 200 CLS
 205 PRINT:PRINT
 240 IF d=0 AND m=0 AND y=0 THE
N INK 0,1:INK 1,24:WINDOW 1,40,1
,25:PEN 1:PAPER 0:CLS:END
 250 IF m<3 THEN m=m+12:y=y-1
 260 a=d+2*m+INT(0,6*(m+1))+y+(
y\4)-(y\100)+(y\400)+2
 270 a=INT((a/7-(a\7))*7+1.5)
 290 PRINT d$(a)
 310 WHILE INKEY$<>"":WEND
 320 WHILE INKEY$="":WEND
 330 WEND
```

Electron/BBC Micro/Archimedes

```
  40 DIM d$(7)
  80 MODE 6
  90 VDU 23,1,0;0;0;0;
 100 VDU 28,4,20,35,4
 110 VDU 19,0,3,0,0,0
 120 VDU 19,1,4,0,0,0
 130 COLOUR 129
 140 COLOUR 0
 160 VDU 28,5,19,34,5
 170 PRINT TAB(8)"DAY OF THE WE
EK"
 180 VDU 28,5,19,34,7
 190 REPEAT
 200 CLS
 205 PRINT:PRINT
 240 IF d=0 AND m=0 AND y=0 THE
N VDU 20,26:CLS:END
 250 IF m<3 THEN m=m+12:y=y-1
 260 a=d+2*m+INT(.6*(m+1))+y+(y
 DIV 4)-(y DIV 100)+(y DIV 400)+
2
 270 a=INT((a/7-(a DIV 7))*7+1.
5)
 290 PRINT d$(a)
 310 REPEAT
 320 UNTIL GET
 330 UNTIL 0
```

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